

NICKEL ORE

Introduction

Nickel is a silver white metal used as an alloy both in ferrous and non-ferrous applications, mainly in steel alloy. Besides, nickel is also used in nickel plating, coin making, ceramics, colouring glass, batteries, electronic circuits and nickel compounds. Nickel is a strategic metal and is found associated with the lateritic deposits of Sukinda valley in Odisha. Nickel is not produced from primary sources in the country and the entire demand is met through imports. However, it is recovered as a by-product in the form of nickel sulphate during refining of copper at Ghatsila copper smelter of Hindustan Copper Ltd. (HCL) in Jharkhand.

Another important source is nickeliferous limonite in the overburden of chromite in Sukinda valley, Jajpur district, Odisha. A suitable process is being developed for its utilisation. In addition, nickel is found associated with uranium deposits at Jaduguda, Jharkhand and a process is being developed for its recovery. Resources are spread over in Singhbhum East district of Jharkhand and Jajpur, Keonjhar, Mayurbhanj districts of Odisha. Resources of nickel ore are also reported from Nagaland and Karnataka and occurrences are reported from Kerala.

Basis of Grade Classification

In the inventory as on 1.4.2015 the resources of Nickel ore have been classified into the following grades:

- i) Ore with (+) 0.9% Ni
- ii) Ore with 0.5 to 0.9% Ni
- iii) Ore with (+) 0.5% Ni (Unclassified)
- iv) Not known grade.

Basis of Categorisation of Resources

As per United Nations Framework Classification (UNFC), resources are broadly classified into 'reserves' and 'remaining resources'.

According to the norm of this system, the estimation of nickel ore in the country have been placed under pre-feasibility (221) & (222), measured (331), indicated (332) and inferred (333) categories of remaining resources.

Salient Features of the Inventory

The total resources of nickel ore in the country as

on 1.4.2015 are estimated at 188.86 million tonnes. The entire resources fall under remaining resource category. There is minor increase in the total resources as compared to previous inventory as on 1.4.2010.

All India scenario of nickel ore reserves, remaining resources and total resources as on 1.4.2015 vis-a-vis 1.4.2010 have been given in Tables - 1 and 2. The tables give an idea about the significant changes in terms of increase and decrease of resources as per lease status, grade and states. In Table-3, district-wise reserves/ resources as on 1.4.2015 have been given.

Out of the total resources, about 90.66 million tonnes (48%) have been placed in freehold, 58.23 million tonnes (31%) in leasehold private and 39.97 million tonnes (21%) in leasehold public areas.

Of the total resources, ore containing 0.5 to 0.9% Ni are 93.53 million tonnes (50%), followed by ore containing (+) 0.5% Ni (unclassified) are 52.97 million tonnes (28%) and resources of ore containing (+) 0.9% Ni are 42.13 million tonnes (22%). A meager quantity of 0.23 million tonnes nickel ore has been placed under not known grade.

The state of Odisha endowed with the largest share of resources of nickel ore in the country at 174.63 million tonnes (92%). These resources have mainly been distributed in three districts, namely Jajpur (139.66 million tonnes), Mayurbhanj (27 million tonnes) and Keonjhar (7.97 million tonnes). Jharkhand has 9 million tonnes (5%) resources estimated in Singhbhum (East) district. Nagaland has 5 million tonnes (3%) resources mainly in Kiphire district. A very meager quantity about 0.23 million tonnes has been estimated in North Kanara district, Karnataka.

The entire resources of nickel ore are placed under remaining resources. Out of this 63.49 million tonnes (34%) are under inferred (333) category. These resources are based on a limited and preliminary exploration. A detailed exploration in these areas may improve the confidence level of the resources.

Total 10 deposits have been covered in the inventory as on 1.4.2015. Out of this 6 deposits are in freehold and 2 deposits each in leasehold public and in leasehold private areas.

**Table - 1 : Reserves/Resources of Nickel as on 1.4.2015 (P) vis-à-vis 1.4.2010
(By Lease Status/Grade)**

(In million tonnes)

Lease status/Grade	Reserves			Remaining resources			Total resources		
	1.4.2015		Net change	1.4.2015		1.4.2010	1.4.2015		1.4.2010
All India : Total	-	-	-	188.86	188.71	188.71	188.86	188.71	188.71
(+)0.9% Ni	-	-	-	42.13	42.13	42.13	42.13	42.13	42.13
0.5 to 0.9% Ni	-	-	-	93.53	93.53	93.53	93.53	93.53	93.53
(+) 0.5 % Ni (Unclassified)	-	-	-	52.97	52.97	52.97	52.97	52.97	52.97
Not known	-	-	-	0.23	0.08	(+) 0.15	0.23	0.08	(+) 0.15
Freehold	-	-	-	90.66	90.66	No Change	90.66	90.66	No Change
(+)0.9% Ni	-	-	-	33.75	33.75	No Change	33.75	33.75	No Change
0.5 to 0.9% Ni	-	-	-	56.91	56.91	No Change	56.91	56.91	No Change
(+) 0.5 % Ni (Unclassified)	-	-	-	-	-	No Change	-	-	No Change
Leasehold (Private)	-	-	-	58.23	58.08	(+) 0.15	58.23	58.08	(+) 0.15
(+)0.9% Ni	-	-	-	-	-	No Change	-	-	No Change
0.5 to 0.9% Ni	-	-	-	21.06	21.06	No Change	21.06	21.06	No Change
(+) 0.5 % Ni (Unclassified)	-	-	-	36.94	36.94	No Change	36.94	36.94	No Change
Not Known	-	-	-	0.23	0.08	(+) 0.15	0.23	0.08	(+) 0.15
Leasehold (Public)	-	-	-	39.97	39.97	No Change	39.97	39.97	No Change
(+) 0.9% Ni	-	-	-	8.38	8.38	No Change	8.38	8.38	No Change
0.5 to 0.9% Ni	-	-	-	15.56	15.56	No Change	15.56	15.56	No Change
(+) 0.5 % Ni (Unclassified)	-	-	-	16.03	16.03	No Change	16.03	16.03	No Change

figures rounded off.

NATIONAL MINERAL INVENTORY - AN OVERVIEW

**Table – 2 : Total Resources of Nickel as on 1.4.2015 (P) vis-à-vis 1.4.2010
(By States)**

(In million tonnes)

State	Total Resources		Net Change
	As on 1.4.2015	As on 1.4.2010	
All India : Total	188.86	188.71	(+)0.15
Jharkhand	9.0	9.0	No Change
Karnataka	0.23	0.23	No Change
Nagaland	5.00	5.00	No Change
Odisha	174.63	174.48	(+) 0.15

figures rounded off.

Table - 3 : District wise Reserves/Resources of Nickel as on 1.4.2015 (P)

(In million tonnes)

State/District	Reserves	Remaining Resources	Total Resources
All India : Total	-	188.86	188.86
Jharkhand	-	9	9
Singhbhum (East)	-	9	9
Karnataka	-	0.23	0.23
North Kanara	-	0.23	0.23
Nagaland	-	5	5
Kiphire	-	5	5
Odisha	-	174.63	174.63
Jajpur	-	139.66	139.66
Keonjhar	-	7.97	7.97
Mayurbhanj	-	27	27

figures rounded off.