CONCEPT OF CAPTIVE MINING FOR STEEL PLANTS: IMPACT ON GROWTH OF IRON ORE RESOURCES

(updated as on 31-05-2017)

I – ORIGIN

The concept of captive mines for steel plant has its origin in India and started with the efforts of visionary Mr Jamshetji Tata who was searching for raw materials for the steel plant which he wanted to set up. Tata Iron and Steel Co. Ltd. (now known as Tata Steel) which he founded and which was established by his son Dorabji Tata on 26th August, 1907 at Jamshedpur, an area surrounded by raw materials. This was followed by Sir Rajen Mookerjee (later his son Sir Biren Mookerjee joined) who promoted Indian Iron and Steel Co. and located its plant at Burnpur in Asansol in West Bengal and incorporated it on 11th March, 1918. The promoters of both these companies scouted the country for raw materials availability and set up steel plants near about them. They took areas on lease and explored and developed them. After Independence, Government of India followed these examples and granted captive mines to various units of SAIL as and when they came up. Thereafter it became a fashion to seek captive mines for steel plants in India.

II – INTERNATIONAL PRACTICE

2. Outside India, we do not find steel industry having been developed based on captive mines; in fact, full potential of iron ore resources is realized only when it is developed as standalone industry. The steel industry developed in (resource-deficient) countries where there was/is demand for the metal: examples being US, Western Europe, (post-World War II) Japan, South Korea and now China. On the other hand, resource-rich countries (such as Brazil, Australia, India, South

Africa) having all (or most of) the raw materials were not able to develop sufficient steelmaking capacity. India does have sizeable steel production but not commensurate to the size of its resources and / or population.

3. Major steel companies in the world (such as in EU, North America, Japan, South Korea and China) do not have captive/controlled mines. However, they ensure their supplies by entering into long-term supply contracts with price negotiations on monthly / quarterly / annual basis and equity participation in iron ore mining companies. After Chinese demand came and prices soared and supplies not keeping pace with demand, the European and other steel plants scoured for iron ore mines in African countries to ensure iron ore supplies at reasonable prices consistently. Following table brings out production, export and import trade, about 85% of which is sea-borne.

Table

Iron ore: World Production and Export-Import Trade

(million tonnes)

Year	Production	Exports			Imports		Total Exports and Imports
		Total	Brazil	Australia	Total	China	
2011	1965.2	1136.7 (57.84)	348.5 (30.66)	438.8 (38.60)	1118.3 (56.91)	686.7 (61.41)	2255.0
2012	1914.6	1167.8 (60.99)	326.5 (27.96)	491.6 (42.10)	1163.1 (66.75)	745.4 (64.09)	2330.9
2013	2049.7	1297.0 (63.28)	329.6 (25.41)	578.5 (44.60)	1247.7 (60.87)	819.4 65.67)	2544.7
2014	2067.4	1422.3 (68.80)	3444 (24.21)	716.8 (50.40)	1397.6 (67.60)	932.5 (66.72)	2819.9
2015	2015.4	1938.7 (96.19)	366.2 (18.89)	766.9 (39.56)	1427.3 (70.82)	950.9 (66.62)	3366.0

Note: Figures in parenthesis show percentage to the total
Source: Iron Ore Manual (2016-17) – The Tex Report, Tokyo

III – MINING: A SPECIALISED VOCATION / DISCIPLINE

4. The reason, why steel (or for that matter aluminium) plants do not have captive mines is the fact that mining is a separate discipline (vocation). The mineral resources buried deep down in the earth, unless extracted, have no value. The job of the miner is to locate them geologically with latest technologies

and then to extract them with appropriate state-of-the-art techniques. Thus a miner ***creates value*** out of no value. However all that extracted from the earth (run-of-mine) is not saleable as it is. The ore has to be sorted out, washed (if necessary) and sized as per the requirements of the buyer. A mine thus **adds value to the value created by him**. This is a full-fledged discipline encompassing all branches such as geology, mining, mechanical and electrical engineering, etc.

5. To ***add*** value to the value created by a miner is done by metallurgist who converts iron ore (along with other materials like manganese, chromite, limestone, dolomite, ferro-alloys, etc.) into metal (crude steel / pig iron). To ***further add*** to the value added by a metallurgist is to make down-stream products like white goods, automobiles, house-hold utensils, construction / housing etc. which are an independent subsequent activities / disciplines.

6. ***If a miner is forced to go for metal making (value addition), he will prove be a bad metal-maker. Conversely, if a metal-maker seeks a captive mine, he will prove to be a bad miner***. This is an age of specialization: one has to choose one's area of specialization. In India captive mines to steel plants have led to distortion of market and affected the growth of robust stand-alone iron ore resource companies.

IV – REPERCUSSIONS

7. The policy of captive mines to steel plants has led to serious repercussions and has affected the growth of a viable mining industry:

- no benefit to the down-stream users of steel as inter-sectoral subsidy from mining sector to steel sector is not passed on to them and hence there are no multiplier benefits.

- along with captive mines, subsidized land for steel plants has kept the Indian steel industry perpetually in animated oxygen tent unable to withstand world competition.
- subsidies in the form of captive leases or concessional land have hidden their inefficiencies and has covered up their windfall profits.
- growth/continuation of inefficient steel sector being subsidized by the mining industry at the cost of its own growth has affected stand-alone iron ore mining companies.
- has made iron ore unattractive to exploration companies and deprived the country of an exploration activity to the extent of US$500 million/year. (This is in addition to FDI in mining proper).
- has deprived the country of world-class stand-alone resource mining companies which could lead to sustainable development of iron ore resources with attendant benefits such as development of infrastructure and socio-economic growth of tribal and backward areas.
- has led to multiple small mines:
    - no economies of scale, higher costs
    - uneconomic to beneficiate
    - no long-term investment in infrastructure except for moving to the steel plants – no benefit to society
    - high grading in cyclical lows, resource destroying
    - greater environmental damage
- has excluded those companies with a proven track record and skills in mine development.

8. Since the policy of captive mines is very much in vogue and is likely to continue, the consequences of this policy on crude steel production so far may be seen in the table at **Annexure** which brings out that the integrated steel plants of TISCO and SAIL (eight plants) have failed to take advantage of surge in domestic demand despite having captive mines (in the case of TISCO, captive mines include those of iron ore, coking coal, manganese ore and chrome ore which make it the cheapest producer of steel in the world). Grant of captive leases to a steel plant leads to **either** windfall profits such as in the case of

TISCO which resulted in acquiring Corus on 20th October, 2006 at a cost of US$ 8.1 (£ 4.3) billion (which provided jobs and investment in a foreign country rather than in India which could be done by reviving Gopalpur Steel Plant for which Odisha Government gave land at concessional price and captive iron ore mine) which very shortly became a drain on the profitability of Tata Steel **or** in perpetuating inefficiency such as in SAIL where crude steel production hovers around 13-14 million tonnes for the last about 10 years despite having spent thousands of crores on modernisation. The domestic consumers of steel get no benefit and procure steel at international (sometimes more) price.

9. In fact, the gap in demand and supply was filled by EAF and IF units so much so that they now constitute about 43.46% of the total domestic crude steel production in 2016–17 (out of 97.39 million tonnes). The IF units do not require iron ore and consume scrap and sponge iron. Further the two secondary producers – ESSAR and JSW – adopt pellet route for steel production. ***The lesson is quite clear that availability of captive sources of raw material supply is not a necessary condition or a prop for increasing domestic steel production at competitive cost.*** In fact, the steel plant like JSW is the most efficient plant even without any captive source.

V – PROVISION FOR CAPTIVE MINES IN NEW DISPENSATION

10. The Mines and Minerals (Development and Regulation) Act, 1957 was amended by MMDR (Amendment) Act, 2015 and made effective from 12th January, 2015 which *inter alia* made auction of resources as a prime condition for grant of prospecting-cum-mining lease (PL-cum-ML) and mining lease. Following the MMDR (Amendment) Act in 2015, new Mineral (Auction) Rules 2015 and Minerals (Transfer of Mining Lease Granted otherwise than

through Auction for Captive Purpose) Rules, 2016 were promulgated. These Rules provide as under:

> Rule 6(4): *Where the State Government reserves a mine or mines for any particular specified end use, the minerals extracted under the mining lease shall, -*
>
> *(i) be utilised solely for the specified end use; and*
> *(ii) not be sold or transferred or otherwise disposed of, either directly or indirectly.* **Mineral (Auction) Rules 2015**
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> Rule 4(3)(d): *the transferee shall ensure that the entire quantity of mineral including rejects or tailings or slimes or dumps or overburden extracted from the mining lease shall be used exclusively for captive purpose and shall not be sold or exported;*
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> **Minerals (Transfer of Mining Lease Granted otherwise than through Auction for Captive Purpose) Rules, 2016**

11. The new dispensation after MMDR (Amendment) Act made effective from 12th January, 2015 provides correctly that the minerals extracted from a mine or mines which has / have been reserved for any particular specified end-use, will be utilised for that end-use only and cannot be sold or transferred or otherwise disposed of either directly / indirectly. Even in the case of mines transferred otherwise than through auction for captive purpose, "*the transferee shall ensure that the entire quantity of mineral including rejects or tailings or slimes or dumps or overburden extracted from the mining lease shall be used exclusively for captive purpose and shall not be sold or exported*".

12. It is a known fact that a deposit or a mine does not contain a uniform grade to maintain a consistent feed. The ore contains various grades with different chemical and physical composition. Even if a plant procures more than one mine in the same area through auction route it is quite possible that the proper feed does not work out. A plant therefore procures the ores from various sources, makes a feed for the plant which has to be consistent all through to make final product uniform in terms of the quality at an economic cost.

13. If the conditions as stipulated in the present dispensation is adhered to, a steel / aluminium plant has to take necessary steps to utilise off-grade by beneficiation or pelletisation or sintering or both to make proper feed for the blast furnace. All these steps would increase the cost of raw materials. Further to overcome the cost and derive maximum value, the steel plants use higher grade (+62-63% Fe) as against world average feed of 60% Fe on the plea that alumina content in the Indian ore is very high which consumes more energy and to compensate the higher energy cost, they have per force to use higher grade ore.

14. However, this lacunae can be overcome if the steel plants purchase ore from different mines to make proper feed for the blast furnace. This will give the plant optimum output at economic cost. This is how countries like Japan, South Korea and China overcome by importing iron ore from around the world to make a proper feed for the blast furnace which makes their product (crude steel) internationally competitive vis-à-vis Indian steel despite this country having all the raw materials except coking coal. The steel produced by Japan, South Korea and China is even more competitive with the steel produced by Tata and SAIL, who have coking coal mines, apart from other raw materials.

VI – RAW MATERIALS AVAILABILITY IS NOT A PRIME CONDITION TO SET UP A STEEL (ALUMINIUM) PLANT

15. The growth of steel (or aluminium) industry in a country depend on the demand for these metals. It is strange coincidence that the resource rich countries are sparsely populated where demand for these metals is limited. The growth of steel (or aluminium) industry depends on domestic demand. To put it bluntly, domestic availability of raw materials is not the prime condition for the growth of steel (or aluminium) industry. Had it been so, Australia or Brazil would have exported only steel (or aluminium) rather than raw materials. Despite exporting all the raw materials for steel and aluminium industries, Australia produced 5.3 million tonnes of steel and 1.68 million tonnes of aluminium in 2016.

Similarly, Brazil produced 30.2 million tonnes of steel and 0.79 million tonnes of aluminium in 2016. The underlying reason is that there is not enough demand for steel and aluminium in these countries.

16. Because of high metal contents in iron ore or bauxite, both these commodities can be transported over long distances using heavy mining and transport equipments and shipping them across countries using very large carriers. Despite being 10,000 miles away from China, Vale supplies a quarter of Chinese requirements of iron ore. As far as Vale is concerned, mainland China accounts for 49.6% of company's total sales and Asia as a whole 65%. Vale built its own fleet of very large ore carriers, known as Valemax, to carry 400,000 tonnes of iron ore, in 2011 in a bid to reduce shipping costs. However following China Shipowners Associations' opposition to handle such a large vessel due to safety concerns, Vale developed a new port facility at Teluk Rubiah (Malaysia) to work around the problem. Vale would transport the ore to Malaysia and from there, Vale would redistribute to China and other Asian countries in smaller vessels. Availability of raw materials at reasonable rate and making steel / aluminium on massive scale make the products cheap. Further, blending of raw materials from various sources makes an ideal feed for the blast furnace.

VII – CONCLUSION

Develop mining as a separate vocation for optimum / full utilisation of resources

17. Grant of captive mine amounts to inter-sectoral subsidy from mining sector to steel sector by enabling steel makers to have access to iron ore at extraction cost or at least one third / fourth of its market value and deprives the mining industry to plough back the surplus (much essential monies) required for exploration and mine development. Since the steel plants do not pass on the subsidy to primary users of steel, there is no multiplier effect and the difference in

the extraction price and market price is absorbed by diseconomies within the steel industry. Since there is robust global supply and trading of steel, there is no significant advantage for domestic primary users to purchase steel from local sources.

18. Grant of captive leases to steel plants has resulted in so many distortions:

- Since no mineral deposit is of uniform grade to provide a consistent feed for blast furnace, there is a tendency to grab more areas than are necessary, hence non-optimal utilisation of resources.
- No blending / beneficiation (manual or mechanical) is attempted because this will increase the cost of `feed' to the blast furnace.
- Since area is large, there is selective or wasteful mining. Captive mining has always played second fiddle to the steel industry.
- No sustainable mining is undertaken; the accent is on feeding own plant.
- There is tendency to mine high grades which gives better or high quality product at a cheaper price. Indian steel plants use high feed material of +62-63% Fe as against international norm of 60% Fe average feed grade.
- Till recently, Indian steel plants were tilted towards the use of lumps whereas fines were dumped aside. The result is that huge dumps of fines are reported at their mine sites.
- With the passage of time, there is gradually more production of fines along with lumps and steel plants having captive mines have started now using fines (sinter feed) along with lumps. However, despite this, the entire fines production is not utilized and they are stacked separately or sold leading to environmental hazards.
- Hardly any additional sintering or pellet capacity has been created by steel plants to consume all the grades mined from the deposit and the excess production is either stacked or sold in the market – domestic or export.

19. On the other hand, stand-alone resource companies have the advantage of

- sustainable and scientific mining, creating massive infrastructure in the form of rail/road, ports, etc. from the mines to the user industries.
- adoption of advanced mining techniques and R&D.
- utilisation of all grades in the mines and supplying them to the consumers at economic cost as per their requirements, thus leading to 'zero waste' mining.
- there is more intense exploration activity leading to the discovery of more resources: increase of iron ore resources from 17564 million tonnes as on 1-4-1980 to 31322 million tonnes as 1-4-2013 or a net increase of 13758 million tonnes despite having mined 3102 million tonnes during this period.

20. The above dissertation brings out clearly that it would be in national interest to develop stand-alone iron ore (bauxite) mining industry so that the resources could be developed optimally and sold in the domestic market. A mineowner is in a better position to provide the iron ore (bauxite) of the specifications and size required by various consumers, if necessary by beneficiation or otherwise. In case, if a particular grade or grades are not required in the domstic market, a mineowner should be allowed to export so that there is no wastage of resources.

Annexure

SHARE OF SAIL AND TATA IN TOTAL CRUDE STEEL PRODUCTION IN INDIA

Year	SAIL	TATA	Other Producers	Total	Contribution to total steel production %	
					SAIL	TATA
2000-2001	10.86	3.56	12.45	26.87	40.42	13.25
2001-2002	11.02	3.74	13.19	27.95	39.43	13.38
2002-2003	11.62	4.09	14.71	30.42	38.20	13.45
2003-2004	12.38	4.22	17.63	34.23	36.17	12.33
2004-2005	12.46	4.10	21.92	38.48	32.38	10.65
2005-2006	13.47	4.73	28.26	46.46	28.99	10.18
2006-2007	13.50	5.17	32.13	50.80	26.57	10.18
2007-2008	13.96	5.01	34.88	53.85	25.92	9.30
2008-2009	13.40	5.64	39.38	58.42	22.94	9.65
2009-2010	13.50	6.56	45.76	65.82	20.51	9.97
2010-2011	13.76	6.85	50.05	70.66	19.47	9.69
2011-2012	13.34	7.12	53.81	74.27	17.96	9.59
2012-2013	13.41	8.13	56.87	78.41	17.10	10.37
2013-2014	13.57	9.15	58.96	81.68	16.61	11.20
2014-2015	13.90	9.33	65.74	88.97	15.62	10.49
2015-2016	14.27	9.96	65.55	89.78	15.89	11.09
2016-2017	14.49	11.68	71.20	97.37	14.88	12.00

Source: Joint Plant Committee (JPC), Kolkata