

Query No. 32

Subject: Valuation of inventory of non-valuated by-products.¹

A. Facts of the Case

1. A Company, a Navaratna Public Sector Undertaking (PSU) (hereinafter referred to as 'the Company'), is engaged in the manufacture of the steel products in India. It is an Integrated Steel Plant producing long products. The products of the Company are being sold both in the domestic as well as export market. The turnover of the Company in the financial year 2019-20 was Rs. 15,819 crores. In the process of steel making, the Company is generating certain by-products, which inter-alia includes BF Granulated Slag, LD Slag (WTS), Metallurgical Waste and Muck & Debris. These by-products are immaterial in value as compared to the value of main product.

2. Process of generation and disposal of BF Granulated Slag

The process of steel making involves various stages of operations wherein certain inputs are consumed and outputs are generated at each stage along with some by-products also. One of such operation is making the Hot Metal wherein iron ore and sinter along with other materials are charged to Blast Furnace (BF) as an input and coke/pulverized coal is used as a heating element. Hot metal is produced as the output in this process and BF slag is generated as by-product. Both hot metal and slag are collected separately and the slag is further processed by quenching in water to make them granulated. The slag is being used in the cement industry as a replacement to clinker.

The granulated slag is stored in the Slag Storage Yard (SSY) located near to Blast Furnace and sold from SSY as a fresh slag. In order to ensure smooth function of Blast Furnace, the excess quantity beyond the capacity of SSY is transported to Slag Storage Yard – 2 (SSY-2), located outside the Blast Furnace area for further sale. In this process of evacuation and storage, over the period of 25-30 years, around 5 million tonnes of slag is accumulated at SSY-2. As the slag stored at SSY-2 is exposed to outside weather, though the chemical property of the product does not undergo any change, physical property of the same undergoes some changes like hardened, colour fading, etc. As a result of it, this slag is sold at lesser price when compared to fresh slag. Further, this hardened slag is being crushed into powder by prospective customers and is being exported to countries like UAE, Bangladesh, South Africa, etc. Considering the usability of this slag in the growing cement industry and the potential for export considering the shore based location of the Plant, it is expected that the demand for this slag will increase.

3. Process of generation and disposal of LD Slag (WTS)

The LD Slag is a by-product which is generated during the process of steel making at Basic Oxygen Furnace (BOF). This is evacuated continuously, transported and getting dumped at Skull Breaker Yard (SBY). However, no credit is given to the cost of main product towards the LD Slag generated in the process. This slag is processed for separation of steel scrap with the help of magnetic separators and the remaining portion is screened to different sizes of slag. Out of processed grades, less than 8 mm is used in Sinter Plant and 30-50 mm grade is majorly used as a substitute for stone ballast in rail tracks and a small portion is used in Blast Furnace and Steel Melting Shop. The remaining grades, 8-30 mm and above 50 mm sizes are

¹ Opinion finalised by the Committee on 9.2.2022.

called Worked Through Slag (WTS) and generally used for land filling jobs. After internal consumption, like land filling, the remaining portion of the Worked through Slag is shifted to the storage yard. In this way, over the period of 25-30 years, around 4 million tonnes of LD Slag (WTS) has been accumulated. These LD slags are mostly used for the purpose of land filling, as a ballasts on railway tracks, for making road, for making fly ash bricks, hard stand, etc. The Company entered into long-term agreement with 2 customers for sale of this slag and as per the Circular dated 21.07.2020 issued by the Ministry of Road Transport & Highways, steel slag can be used in the National highways works. Accordingly, efforts are being made to tie up with the contractors executing the National highways works to promote further usage and sale of LD Slag. Further, during the year, customers have shown interest in exporting the LD Slag for its usage in road making projects.

With regard to saleability/usability of BF Granulated (Iron) Slag and LD (Steel) slag, the querist has separately clarified as follows:

- Saleability/usability of these slags has substantially increased after issue of IS 383:2016- Revision 3 standard for 'Coarse and Fine aggregates for concrete'. This revision over previous IS 383 : 1971, permits use of 'manufactured aggregates' such as iron and steel slag in concrete in place of previous Natural Aggregates'
- In addition to the above, due to other reasons such as non-availability of natural aggregates and more awareness regarding iron and steel slag, it is seen that there is demand for use of these slags for various purposes.
- Off late there is growing demand for Steel Slag after processing them into aggregates for use in road making.

Due to the above mentioned developments, the scope for saleability/usability of the slags has increased substantially.

4. *Process of generation and disposal of Metallurgical Waste*

During the process of steel making, certain metallurgical wastes are being generated in the form of Mills Scale, Gas Cleaning Plant (GCP) Sludge, Cast House Dust, Met Pond Sludge, etc. Metallurgical wastes generated out of Blast Furnace and Steel Melting Shop are transferred to Metallurgical Pond. Upon drying, the dried sludge is transported to raw material bins of Sinter Plant on daily basis. Majority of these products are being consumed internally in the Sinter Plant for sinter preparation since they are having good iron (Fe) content (50-55%) and can be used back through recycling. The accumulated stock (over and above the consumption at Sinter Plant) of metallurgical waste is around 0.4 million tonnes available at the site. Presently recycling of these metallurgical wastes is being done in Sinter Plant. However, there is technical limitation for 100% recycling of the metallurgical waste, in the present form, at Sinter Plant.

As these metallurgical wastes have 50-54% Fe content and are consumed internally, during the year the Company decided to enhance the use of these metallurgical wastes by adopting the latest advanced technology of converting them (by installing facilities) into Micro Pellets/Briquettes. The Micro Pellets will be used in the Sinter Plant in place of iron ore and Briquettes will be used in Steel Melting Shop in place of steel scrap; and thus add significant value. It is estimated that more than Rs. 150 crores per annum can be saved by consumption of these products at the Company. Also, their use promotes recycling of significantly larger

quantities of the metallurgical wastes. The practice of utilisation of metallurgical wastes after conversion is an established practice in many steel plants world over.

The querist has also separately clarified that usability of metallurgical waste after conversion into products such as briquettes and micro pellets has gained interest in India after witnessing the benefits accruing from such facilities established at another entity's premises at Bellary in 2014-15.

5. *Process of generation and disposal of Muck & Debris*

The Muck & Debris generated from all over plant are dumped continuously at Central Dump Processing Yard (CDPY) and it is processed for recovery of metal portion through Magnetic Cranes and recovery of used Refractory Bricks. Some portion of the refractory bricks recovered from the debris are sent to stores for sales through auction and some portion is sent to SMS for converter patch work. The remaining Muck & Debris portion after recovery of metal and refractory materials, is shifted to Muck & Debris Dump. Since this material, i.e., Muck & Debris generated at CDPY is a heterogeneous mixture of all sorts of materials, it is not possible to ascertain percentage of any kind of material embedded thereon. Hence, the exact usability and saleability cannot be determined. The querist has separately clarified that the Muck & Debris at the final dump yard is a waste product for the Company. The present stock of Muck & Debris at Dump is tentatively estimated around 30 Lakh tonnes. During the year, the Company has floated Expression of Interest for the sale of this material. Good number of customers had shown interest in lifting this material. It is expected that the accumulated stock of 30 lakhs tonnes would be liquidated gradually.

6. The querist has given below the accounting treatment being followed by the Company:

(i) BF Granulated Slag –

At the time of production itself, the BF Granulated Slag is classified into Fresh Slag at SSY and SSY-2 slag by taking into account the availability of storage space in SSY.

A. Fresh Slag (SSY):

a. Treatment in the costing:

The fresh slag is valued at net realisable value (NRV) in the costing process and the same is credited to the process in which it is generated. In case it is consumed internally, it is also valued at the same rate.

b. Valuation of inventory:

On reporting date, the inventory of fresh slag is valued at net realisable value.

c. Revenue Recognition:

Revenue is recognised in the books of account as and when sold.

B. Slag at SSY-2:

a. Treatment in the costing:

No credit is given to the process to the extent of classification of BF Slag into SSY-2 Slag over the period of 25-30 years.

b. Valuation of inventory:

On reporting date, to the extent of quantity identified for sale by way of firm contract or MOU or long-term contract is valued at net realisable value. Balance quantity of SSY-2 slag is valued at nil NRV in the books of account. However, quantity details are mentioned in the notes to accounts.

c. Revenue Recognition:

Revenue is recognised in the books of account as and when sold.

(ii) LD Slag (WTS) –

a. Treatment in the costing:

Till financial year (F.Y.) 2018-19, LD Slag (WTS) generated during the year as well as the accumulated stock was valued at nil NRV and credit also not given to the cost of production of main product. However, w.e.f. F.Y. 2019-20, only the quantity generated during the year has been valued at current NRV and credit also given to main product in the costing process.

b. Valuation of inventory:

The accumulated inventory till 2018-19 has been valued at nil NRV in the books of account. However, w.e.f. F.Y. 2019-20, inventory generated during the year was valued at current NRV.

c. Revenue Recognition:

Revenue is recognised in the books of account as and when sold.

(iii) Metallurgical Waste:

a. Treatment in the costing:

As metallurgical wastes are presently being treated as non-valuated products due to valuation at nil NRV, no value is being assigned for the same at the time of generation as well as at the time of consumption in the costing process. However, generation and consumption quantities are being shown in the cost statements.

b. Valuation of inventory :

As these are presently considered as non-valuated materials due to nil NRV, no value is assigned for the inventory.

c. Revenue Recognition:

Since these materials are used for internal consumption only and not sold, no revenue is recognised in the books of accounts.

(iv) Muck & Debris:

a. Treatment in the costing:

As Muck & Debris is generated all over the Plant and is the remaining part after recovery of metal and refractory material therefrom, these are treated as non-valuated products due to nil NRV and no value is being assigned for the same at the time of generation in costing.

b. Valuation of inventory :

As these are presently considered as non-valuated materials due to nil NRV, no value is assigned for the inventory.

c. Revenue Recognition:

Revenue is recognised in the books of account as and when sold.

The querist has separately informed that the inventory of these by-products were generated over a period of time and at the time of their generation, no deduction was made from the cost of the main product because the then NRVs for these by-products were nil i.e., no active market existed for these by-products. In other words, the NRV was estimated at 'zero'. However, due to the recent advancement in the technology/market, these inventory of by-products are expected to fetch certain values in the current period. Hence, the Company desires to value these immaterial by-products at current NRV since the Company is in possession of these stock physically and records with respect to the quantity generated are also available.

7. Thus, considering the developments during the year, the Company is planning to value the accumulated stock of BF Granulated Slag of around 5 million tonnes and LD Slag (WTS) of around 4 million tonnes at current NRV.

With respect to metallurgical wastes, the Company decided during the year to adopt the latest advanced technology of converting them into Micro Pellets/Briquettes for its enhanced usage. The Company is planning to value the existing stock of 0.4 million tonnes of metallurgical wastes at the prevailing price of iron ore fines with due adjustment for its Fe content as these have economic value.

With respect to Muck & Debris, considering the latest developments in the marketability of this product, the Company is planning to value the existing stock of 3 million tonnes at average NRV.

8. Further, with regard to how long these products have been held by the Company and also the reasons for a large quantity of accumulated stock of the above-mentioned by-products over the period, the querist has separately clarified as follows:

S.No.	By-product description	% Average utilisation of generation	Reasons for non-utilisation	Remarks
1	BF Granulated (Iron) Slag	1990-2000: 48% 2001-2010: 84% 2011-2020: 106%	Variation in demand as per requirement by cement manufacturers.	Large quantities of accumulation due to high specific generation of slag @ 300-330 kgs/t of hot metal.
2	LD (Steel) slag	2001-2010: 60% 2011-2020: 41%	Avenues for recycling of LD slag is limited due to technological reasons.	Large quantities of accumulation due to high specific generation of slag @ 130-150 kg/t of liquid steel. It shall be consumed in large quantities once Central Road Research Institute provides guidelines/specifications for the same. The same are expected by December'21.
3	Metallurgic Wastes	60-70%	Technological limitation for recycling in Sinter Plant	100% utilisation of the metallurgical wastes shall be accomplished by briquetting and micro pelletisation.

4	Muck & Debris	NA	Heterogeneous mixtures of all materials	
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The querist has also clarified that the net realisable value of these non-valuated by-products at the time of origination is not material in comparison to the value of the main product. Further, there is no substantial increase in net realisable value from 2018-19 to 2020-21.

Further, regarding whether the value at which the Company now wishes to value these non-valuated products is considered material from financial reporting purposes or not, the querist has clarified that the value is considered material, as the Company is planning to value the entire accumulated stock whose value would be around Rs. 370 crores which represents 7.5% of total inventories value of the Company.

With regard to whether the Company expects to sell or consume internally all the accumulated quantities in the near future for all the four referred by-products (valued at 'Nil'), the querist has stated that the Company expects to sell or consume the accumulated quantities as per the plan given below:

S. No.	Accumulated By-product	Plan for utilisation of accumulated by products	Remarks
1	BF Granulated (Iron) Slag	Conversion into Slag sand to meet standards specified by IS 383:2016-Revision 3	Simple process of shaping for conversion and sale into the market as 'Slag sand'. Already being marketed by another entity in the industry.
2	LD (Steel) slag	By converting into aggregates for use in road making	Already being done by another entity in the industry. Huge potential exists since about 2500T of aggregates are required for every KM of new road.
3	Metallurgic wastes	All accumulated wastes to be consumed in briquetting and micro palletisation.	Accumulated metallurgical wastes shall be consumed within 7 years of operation of the facility.
4	Muck & Debris	Planned to sell based on the customer requirements.	--

The querist has also pointed out that huge potential exists for consumption of these accumulated by-products/wastes. This is evident from these being utilised extensively in other countries. 100% utilisation has been achieved by consuming them in various applications. World Steel Association (which represents 85% of steel producers, national and regional steel industry associations, and steel research institutes worldwide) terms metallurgical wastes (dust, sludges), slags etc. as 'Solid Co-products'. Document titled 'Steel Industry Co-Products World Steel Position Paper' showcases this aspect and has been separately supplied by the querist for the perusal of the Committee.

B. Query

9. In this context, the opinion of the Expert Advisory Committee of the Institute of Chartered Accountants of India is sought on the following issues:

- (i) Considering the developments during the year with respect to the marketability and usability of the above by-products, the Company is planning to value the accumulated stock of these by-products by giving credit to the Statement of Profit and loss in the current year and to disclose the same in the notes to accounts. Is the Company's plan in line with Ind AS?
- (ii) Whether the accounting treatment due to the proposed change in valuation as a change in accounting estimate rather than change in accounting policy, is as per Ind AS 8.

C. Points considered by the Committee

10. The Committee notes that the basic issue raised in the query relates to valuation of accumulated inventory of various by-products/waste products, mentioned in the Facts of the Case, viz., BF Granulated Slag (stored at SSY-2), LD Slag (WTS), Metallurgical Wastes and Muck & Debris. The Committee has, therefore, considered only this issue and has not examined any other issue that may arise from the Facts of the Case, such as revenue recognition in respect of these by-products or from sale of steel products, appropriateness of accounting treatment followed by the Company with respect to any other product (main/joint/by-product) generated as output in steel making process, such as Fresh Slag (stored at SSY), different types/sizes of LD slag other than WTS, refractory bricks etc., appropriateness of methodologies used for determining cost and net realisable value of various products and by-products, etc.

At the outset, the Committee presumes from the Facts of the Case that the above-mentioned products, viz., BF Granulated Slag (stored at SSY-2), LD Slag (WTS) and Metallurgical Wastes are by-products by nature and are immaterial in value as compared to value of main product at the time of their origination. The Opinion expressed hereinafter is purely from accounting perspective and not from legal perspective. Further, the accounting Standards referred hereinafter are Indian Accounting Standards, notified under the Companies (Indian Accounting Standards) Rules, 2015, as amended/revised from time to time.

11. The Committee further notes the following paragraphs of Indian Accounting Standard (Ind AS) 2, 'Inventories':

"Costs of conversion

...

- 14 A production process may result in more than one product being produced simultaneously. This is the case, for example, when joint products are produced or when there is a main product and a by-product. When the costs of conversion of each product are not separately identifiable, they are allocated between the products on a rational and consistent basis. The allocation may be based, for example, on the relative sales value of each product either at the stage in the production process when the products become separately identifiable, or at the completion of production. Most by-products, by their nature, are immaterial. When this is the case, they are often measured at net realisable value and this

value is deducted from the cost of the main product. As a result, the carrying amount of the main product is not materially different from its cost.”

From the above-mentioned requirements of Ind AS 2, the Committee notes that when by-products are produced simultaneously with the main product, the cost of conversion till that stage is assigned to/allocated between them on a rational and consistent basis, for example, on the basis of relative sales value of each product, so as to arrive at their respective costs till the stage of separation, which becomes the basis for their valuation in the further stages. However, the immaterial by-products are often measured at net realisable value (NRV) and the same is deducted from the cost of the main product and as a result of which, the carrying amount of the main product is not materially different from its cost. The Committee is of the view that the objective of principle laid in paragraph 14 of Ind AS 2 is to allocate production/conversion costs on a reasonable basis so as to determine the cost of production/conversion of each individual product being produced simultaneously in the production process which is not materially different from the actual cost. Thus, the costs so arrived at become the substitute of the cost for valuation of inventories subsequently. Accordingly, subsequently while measuring the inventories at the lower of cost and net realisable value as per the principles of Ind AS 2, such cost should be considered.

12. With regard to net realisable value, the Committee further notes the following requirements of Ind AS 2:

“Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs of completion and the estimated costs necessary to make the sale.”

“7 Net realisable value refers to the net amount that an entity expects to realise from the sale of inventory in the ordinary course of business. Fair value reflects the price at which an orderly transaction to sell the same inventory in the principal (or most advantageous) market for that inventory would take place between market participants at the measurement date. The former is an entity-specific value; the latter is not. Net realisable value for inventories may not equal fair value less costs to sell.”

“30 Estimates of net realisable value are based on the most reliable evidence available at the time the estimates are made, of the amount the inventories are expected to realise. These estimates take into consideration fluctuations of price or cost directly relating to events occurring after the end of the period to the extent that such events confirm conditions existing at the end of the period.

31 Estimates of net realisable value also take into consideration the purpose for which the inventory is held. For example, the net realisable value of the quantity of inventory held to satisfy firm sales or service contracts is based on the contract price. If the sales contracts are for less than the inventory quantities held, the net realisable value of the excess is based on general selling prices. Provisions may arise from firm sales contracts in excess of inventory quantities held or from firm purchase contracts. Such provisions are dealt with under Ind AS 37, *Provisions, Contingent Liabilities and Contingent Assets.*”

The Committee notes from the above that as per the principles of Ind AS 2, while determining the net realisable value (NRV), the amount the inventories are expected to realise, the purpose for which the inventory is held, for example, quantity of inventory held to satisfy a firm sales

contract or for internal consumption, demand in the market, general selling prices, etc. needs to be considered.

13. The Committee further notes that in the extant case, certain quantities of BF Granulated Slag (stored at SSY-2), LD Slag (WTS) and Metallurgical Wastes being in excess of internal consumption or expected to be sold were valued at nil NRV, which implies that these were considered to be not realisable either through use or sale at time of their origination. Further, as a result of this, there was an accumulated stock of these inventories of by-products, which the Company desires to value at current NRV as these products are now expected to fetch certain values in the current period due to recent advancement in the technology/market. In this regard, the Committee is of the view that as discussed in paragraph 11 above, the cost of by-product arrived at on the basis of NRV at the time of their origination or separation from main product becomes the substitute of cost for subsequent valuation of inventories. Therefore, inspite of increase in NRV of by-products, their value for accounting cannot be increased since as per the principles of Ind AS 2, these need to be valued at lower of cost (which is nil in the extant case) and NRV.

Further, with regard to Muck & Debris, the Committee is of the view that although the muck & debris is a waste product, since it is produced and sold in the 'normal course of business', it is of the nature of 'inventory' as per Ind AS 2 and the accounting prescribed in respect of by-product under paragraph 14 of Ind AS 2 may be applied. Therefore, the accounting prescribed above in respect of other by-products should be applied in case of muck and debris also.

14. With regard to the issue raised by the querist that whether the change in valuation of inventory due to change in NRV is a change in accounting estimates or change in accounting policy, the Committee notes the following paragraphs of Ind AS 8, 'Accounting Policies, Changes in Accounting Estimates and Errors':

“A change in accounting estimate is an adjustment of the carrying amount of an asset or a liability, or the amount of the periodic consumption of an asset, that results from the assessment of the present status of, and expected future benefits and obligations associated with, assets and liabilities. Changes in accounting estimates result from new information or new developments and, accordingly, are not corrections of errors.”

“14 An entity shall change an accounting policy only if the change:

(a) is required by an Ind AS; or

(b) results in the financial statements providing reliable and more relevant information about the effects of transactions, other events or conditions on the entity's financial position, financial performance or cash flows.”

From the above, the Committee notes that any change in NRV of the inventory of the by-product is the result of changes in technological advancements and new developments, and not due to initial application of any new Standard or accounting requirements. Therefore, these should be considered and accounted for as changes in accounting estimates as per the requirements of Ind AS 8. However, since as discussed above, cost of these accumulated inventories of by-products has been considered at nil considering nil net realisable value earlier, inspite of increase in NRV of by-products, their value for accounting cannot be

increased since as per the principles of Ind AS 2, these need to be valued at lower of cost (which is nil in the extant case) and NRV.

D. Opinion

15. On the basis of the above, the Committee is of the opinion that:

- (i) The accounting for accumulated stock of immaterial by-products/waste product, viz., BF Granulated Slag (stored at SSY-2), LD Slag Worked Through Slag (WTS), Metallurgical Waste and Muck & Debris, should be done as discussed in paragraphs 11 to 14 above.
- (ii) Change in valuation of inventory due to change in NRV, is a change in accounting estimate. However, as discussed in paragraph 14 above, since cost of these accumulated inventories of by-products has been considered at nil considering nil net realisable value earlier, inspite of increase in NRV, their value for accounting cannot be increased since as per the principles of Ind AS 2, these need to be valued at lower of cost (which is nil in the extant case) and NRV.
