ANNEXURE - XXI

NOTE ON END USE OF PRODUCT

1) Industry End-Use in Terms of Physical and Chemical Composition.

i) End-use of Mineral:

Iron and manganese ore produced from the Khondbond Iron & Manganese Mine will be supplied to Company's Steel Plants and TIS group companies.

Iron Ore:

Company intend to Mine 8 MTPA of Iron ore (ROM). After necessary processing through beneficiation 6 MTPA of finished product/ despatchable grade iron ore shall be produced. It is proposed that the finished product i.e. sized ore and fines ore produced from Khondbond Iron & Manganese Mine shall be transported to Company's Steel Plants at Jamshedpur & Kalinganagar and other sister concerns like TML, TSIL & Tayo at present by road or by rail through Joda East siding, Juruli siding, Nayagarh siding, Deojhar siding, Banspani Iron Mines siding (BIL) and other private/public sidings. In future after Overland Conveyor System (OLCS) is installed, finished product shall be conveyed through the same.

Manganese Ore:

Company intends to enhance High Carbon Ferro Manganese (HC Fe-Mn) production capacity from 0.0504 MTPA to 0.06 MTPA by design modifications in the existing 1x9 MVA furnace and with addition of 0.06 MTPA Si-Mn plant and 0.05 MTPA sinter plant at Joda, Keonjhar district, Odisha.

In this proposed scheme period, the pre requisite of EIA-EMP, Public Hearing, has been completed successfully on 12.11.2014 and the EIA-EMP approval is in process. Apart from this, company also proposes to acquire a Silico-Manganese plant of 0.050 MTPA capacity. This would help to utilize the medium grade, low grade and manganese ore fines generate during the mining operation.

The fines generated during the manual sorting process of different grade type having physical and chemical specification shall be utilized in the upcoming sinter plant followed by consuming it in the above mentioned plants.

There is no change in the specifications of the manganese ore to be produced from the mine. However, the Ferro Alloys Plant, Joda presently requires an Mn:Fe ratio of 5.3:1 in the manganese ore as against its earlier requirement of Mn:Fe ratio of 4.8:1 as mentioned in the approved mining scheme. The specifications of ore required for Ferro manganese alloy (FeMn) & Silico Manganese (SiMn) production is as follows:

Usage	Mn	Fe	SiO2	Al2O3 (Max)	P (Max)	Mn/Fe
FeMn	46-48%	8-9%	4.5-5%	4%	0.15%	5-6
SiMn	32-40%	5-12%	10-15%	2%	0.15%	2-8

The different grades of ore from all the quarries/mines of the Company are ultimately blended in the plant to meet the desired specification as mentioned above for production of Ferro manganese / other alloys.

With the enhanced production of high grade manganese ore as envisaged in this mining scheme it is hoped that the purchase of manganese ore shall be substantially reduced. In

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the course of producing higher grade manganese ore a surplus quantity of medium and low grade manganese ore shall be produced.

As the inventory of Medium grade and Low grade manganese ore lying in the mines is huge and posing space constraint for safe and smooth operation of mines, utilization of these materials through EPAs to convert manganese ore to SiMn for further use in Tata Steel's plant will facilitate the smooth and safe operations as well as maximize the use of mineral resource available with them.

After obtaining the required permissions from the State Government, the company may sell this surplus low and medium grade ore to domestic parties in order to make space to stack manganese ore.

ii) Physical & Chemical Specifications of Product:

The specifications of various grades of manganese ore products are as follows:

TABLE: IIa
Manganese Ore

Grade Type	Chemical Specification	Physical Specification
Chemical Grade / Dioxide	Mn > 48 % & Fe < 4 %	+10 -75 mm, 6-25mm
High Grade	Mn > 46 %	+10 -75 mm, 6-25mm
Medium Grade	Mn > 35 % & Fe < 26 %	+10 -75 m
		+ 6 -25 mm
Low Grade	Mn > 25 % & Fe < 35 %	+10 -75 mm
		+ 6-25mm
Sub Grade Mineral	Mn>10% & <25%	-10mm & All Size.

The specifications of various grades of iron ore products proposed to be produced are shown in table: 5.1b.

TABLE: IIb
Specification Of Products From Existing Plant: Iron Ore

Product	Product Physical Quality		Chemical Quality	
	Under Size	Over Size	Fe%	
Lump Ore (+5-18mm)	7%	7 %	64.0-66.0	(Al2O3+SiO2) 5.0-6.0%
Lump Ore (+10-40mm)	7%	8 %	64.5-65.5	Al2O3:(1.3-1.6) %
Fines(-5mm, -8mm)	5%	5%	63.5-65.5	Al2O3:(1.5-3.5) %

The average Physical and Chemical specifications of the products generated from the proposed beneficiation plant at Khondbond are as follows:

TABLE: IIc
Specifications Of Products From Proposed Beneficiation Plant

Product	Product Physical Quality		Chemical Quality	
	Under Size	Over Size	Fe%	Al2O3%
Lump Ore (+5-18mm)	7.65%	5 %	64.0-66.0	(Al2O3+SiO2) 5.0-6.0%
Lump Ore (32mm,+8mm)	5% avg	5% max	>65%	1.6 ± 0.5%
Fines (-8mm)	10% avg	4% max	>64%	2.2 ± 0.5%

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The average Physical and Chemical specifications of the products generated from the proposed mobile crushing & screening plant at Khondbond are as follows:

TABLE: IId
Specifications Of Products Of Proposed Mobile Crushing & Screening Plant

Product	Product Physical Quality		Chemical Quality	
	Under Size	Over Size	Fe%	Al2O3%
Lump Ore (+8,-32mm)	8% avg	2.5% avg	>64.0-66%	1.5-3.0
Fines (-8mm)	5.5% avg	4.08% avg	>62.5%	3.5-4.5

2) Requirement of intermediate industries involved in up-gradation of mineral before its end-use: Not Applicable

3) Requirements for other industries, captive consumption, export, associated industrial use etc.

Manganese Ore

Grade Type	**Chemical Specification**	**Physical Specification**
Chemical Grade / Dioxide	Mn > 48 % & Fe < 4 %	+10 -75 mm, 6-25mm
High Grade	Mn > 46 %	+10 -75 mm, 6-25mm
Medium Grade	Mn > 35 % & Fe < 26 %	+10 -75 m
		+ 6 -25 mm
Low Grade	Mn > 25 % & Fe < 35 %	+10 -75 mm
		+ 6-25mm
Sub Grade Mineral	Mn>10% & <25%	-10mm & All Size.

Iron Ore

Product	Product Physical Quality		Chemical Quality	
	Under Size	Over Size	Fe%	
Lump Ore (+5-18mm)	7%	7 %	64.0-66.0	(Al2O3+SiO2) 5.0-6.0%
Lump Ore (+10-40mm)	7%	8 %	64.5-65.5	Al2O3:(1.3-1.6) %
Fines(-5mm, -8mm)	5%	5%	63.5-65.5	Al2O3:(1.5-3.5) %

4) Precise physical and chemical specification stipulated by End Users:

Physical Specification:

Product	**Size Range**
Sized Ore	- 40 mm + 10mm
Blended Fines	- 10 mm

Chemical Specification:

Principal Constituents	**Sized Ore**	**Fines**
Fe%	65% (Min)	64% (Min)
Al2O3%	1.50 avg.	2.00% avg.
Phos%	0.050% avg.	0.070% avg.

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