



**TATA STEEL LTD.**  
**FERRO MANGANESE PLANT, JODA**

Ref. No. FAPJ/ 4122 /14 /2014 Dated : 22/09/2014

The Member Secretary  
Odisha Pollution Control Board  
A/118, Nilakantha Nagar  
Bhubaneswar

Sub : Submission of Environmental Statement.

Sir,

We are submitting one set of Annual Environmental Statement in respect of M/s Ferro Manganese Plant, Joda for the year ending 31<sup>st</sup> March, 2014.

This is for your kind perusal.

Thanking you,

Yours faithfully,  
For : TATA STEEL LTD.

*Surande*  
22/09/2014  
HEAD  
FERRO MANGANESE PLANT,  
JODA

Encl : as above.

Copy to -Regional Officer, OPCB, At-Baniapatt, College Road, Keonjhar - with enclosure.

**TATA STEEL LTD.**  
Ferro Alloys & Minerals Division  
Ferro Manganese Plant, Joda  
Joda - 758034, Odisha, India  
Tel : 09238100945, e-mail - head.office@tatasteel.com  
Regd. Office : Bombay House, 24 Homi Mody Street, Mumbai - 400 001

**ENVIRONMENTAL STATEMENT  
OF  
FERRO MANGANESE PLANT  
(TATA STEEL LIMITED)  
JODA, KEONJHAR**

**FOR THE YEAR 2013-2014**

**PREPARED BY  
THE DEPARTMENT OF SAFETY & ENVIRONMENT  
FERRO MANGANESE PLANT  
TATA STEEL LIMITED  
JODA, DIST. KEONJHAR**

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## INTRODUCTION

The Ferro Manganese Plant is situated at Joda, which is a Block Head Quarters under the Champua Sub-division and belongs to the district of Keonjhar prior to the establishment of this Plant, M/s TATA STEEL Ltd. used to produce Ferro Manganese alloy, which is an essential additive to liquid steel for enhancing its rolling properties, in one of its blast furnaces. It was only in 1958 when a Plant was set up at Joda for producing Ferro Manganese alloy with a capital investment of 1.58 crores.

The Plant was set up by M/s ELECTROKEMISK, A.S. of Norway and initially consisted of two 9 MVA sub-merged electric arc furnaces with an installed capacity of 100 TPD of Fe Mn.

The 15 MVA and 9 MVA furnace is used to produce High Carbon Ferro Manganese,

It is obvious that the economic development of a nation rests on the extent of industrialization it has. With the advent of the Industrial Revolution, the global economic growth has assumed staggering proportion. But simultaneously this phenomenon has substantially impeded the preservation of flora and fauna which is imperative for human existence. Indiscreet exploitation of natural resources has resulted in gross environmental degradation. So, to help preserve the natural habitat, the Government has enacted various laws in order to bridle the environmental pollution caused by the industries.

M/, M/s TATA STEEL Ltd. has always supported the cause of environmental protection and has adopted environmental measures both in letter and spirit. The Environmental Audit Report, a topic notified on the 13<sup>th</sup> March, 1992 as an outcome of the amendment of the Environment (Protection) Rules, 1986, is basically an annual status report of an industry as regards the environmental measures adopted by the industry to protect and improve the work environment and the periphery.

**FORM - V**

**Environmental Statement for the financial year ending on 31.3.2014**

**PART - A**

1. Name and address of the Owner/occupier of the industry, operation or process. : Mr. B.D.NANDA  
Head, Ferro Manganese Plant,  
TATA STEEL Ltd., AT/PO-JODA
2. Industry Category : Large
3. Production Capacity of Ferro Alloys. : 50,400 MT/Year
4. Year of establishment : 1958
5. Date of submission of previous Environmental Statement : 20th September, 2013

**PART - B**

**Water and Raw Material Consumption**

Water Consumption - Water is used inside the Plant for the following purpose

- a) Industrial Cooling
- b) Process and
- c) Domestic Purpose

Water consumption under all the three heads for the assessment year are as follows:-

1. Industrial Cooling : 182671 M<sup>3</sup>
2. Process : 52313 M<sup>3</sup>
3. Domestic : 14580 M<sup>3</sup>

**Process water consumption per unit of product out put :-**

NAME OF THE PRODUCT(S)	RATE OF WATER CONSUMPTION IN M <sup>3</sup> /T	
	DURING THE PREVIOUS FINANCIAL YEAR	DURING THE CURRENT FINANCIAL YEAR
High Carbon FeMn	4.31	4.95

**B. Raw material Consumption :-**

The raw material consumption for the production of FeMn are as follows :-

**FeMn :**

Raw Materials Used	Quantity used to produce 1 MT of FeMn for the Previous Year(2012-13)	Quantity used to produce 1MT of FeMn for the current year(2013-14)
Manganese Ore	2219 Kgs	2167 Kgs
Coke	519 Kgs/380 Kgs(F.C.)	529 Kgs/371 Kgs(F.C.)
Dolomite	283 Kgs.	279 Kgs.

\* F.C=Fixed Carbon

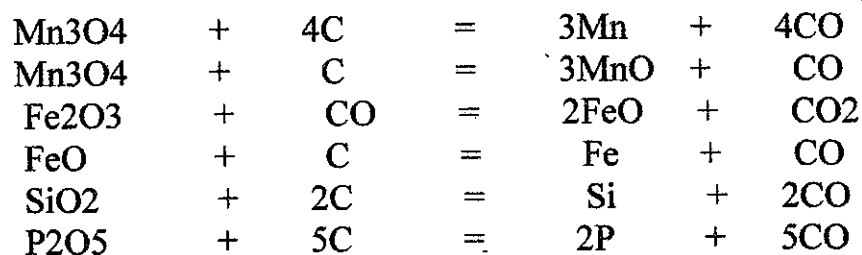
**PART - C**

**Pollution discharged to environment / unit of output**  
**( Parameter as specified in the Consents issued)**

Basically the plant produces air pollution and the causes can be attributed to the process which has been briefed as follows:-

**Brief description of the process producing FeMn :**

During the smelting process, oxides of Iron, Manganese, Silicon, Sulphur and Phosphorous are reduced and the reactions involved in the above process are as follows:-



The Sulphur goes into the Slag and also escapes to the atmosphere through the stack as SO<sub>2</sub>.

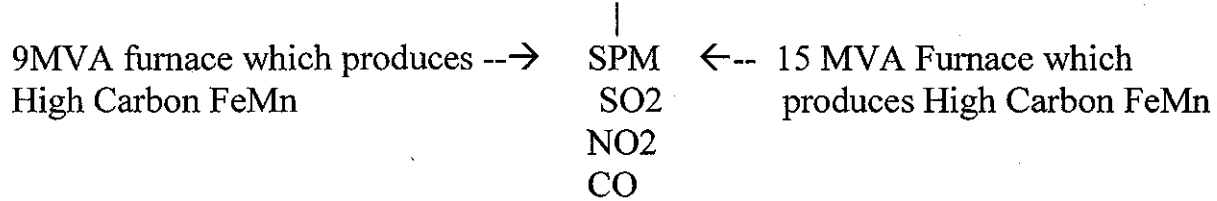
**Sources of Pollution :**

The sources of pollution can be in the form of:

- 1. Air Pollution
- 2. Water Pollution

Air Pollution :-

To Atmosphere thro' GCPs



Water Pollution:-

The water used for cooling several parts of the Furnaces as well as scrubbing the flue gas in the Gas Cleaning Plants is recirculated to the system and is not discharged outside the Plant.

**DETAILS OF THE ENVIRONMENTAL MONITORING**

**Stack Emission Quality :**

	TYPE OF AIR POLLUTANTS	CONCN.OF POLLUTANTS IN mg/NM <sup>3</sup>	PRESCRIBED STANDARDS IN mg/NM <sup>3</sup>	% OF VARIATION FROM THE NORMS WITH REASONS
STACK EMISSION OF FCE #1	SPM	57 (max)	100.0	- 43% (due to the effective operation of Gas Cleaning Plant)
STACK EMISSION OF FCE# 2	SPM	61 (max)	100.0	- 39% (due to the effective operation of Gas Cleaning Plant)

AMBIENT AIR QUALITY :

TYPE OF AIR POLLUTANTS	CONCN.OF POLLUTANTS IN Microgram/M3	PRESCRIBED STANDARDS IN Microgram/M3	% OF VARIATION FROM THE NORMS WITH REASONS
SO2	4.98 *	50	
NOX	11.66 *	40	- 28.34%
CO	0.19**	2.0/8 Hrs	The CO gets diluted in the air immediately
Particulate Matter(<10mic)	53.07*	60	- 6.93%
Particulate Matter(<2.5mic)	30.46*	40	- 9.54%

\*Annual average

\*\* in mg/NM3

**PART - D**

**HAZARDOUS WASTES**

(AS SPECIFIED UNDER THE HAZARDOUS WASTES)

HAZARDOUS WASTES	TOTAL QUANTITY	
	DURING THE CURRENT YEAR(2012-2013)	DURING THE CURRENT YEAR(2013-2014)
I) FROM PROCESS		
a. USED TRANSFORMER OIL	5528 Lts*	6489 Lts*
b. WASTE OIL	Nil (Garage activities have been totally stopped)	Nil (Garage activities have been totally stopped)
c. WASTE BATTERIES	NIL	NIL
II) FROM POLLUTION CONTROL FACILITY	3600 MT(Approx.)	3600 MT(Approx.)

\* Including Back log

**PART - E**

**SOLID WASTES**

SOURCES	TOTAL QUANTITY	
	DURING THE CURRENT YEAR(2012- 2013)	DURING THE CURRENT YEAR(2013- 2014)
a. From Process		
i) Slag	35,210 MT	40,613 MT
ii) Cotton wastes	Nil(The use has been stopped completely)	Nil(The use has been stopped completely)
iii) Waste Batteries	Nil	Nil
b. From Pollution Control Facility.	3600 MT(Approx)	3600 MT(Approx)
c. i.Quantity recycled or Reused within the unit	NIL	NIL
ii.Quantity sold	46,142 MT of Slag *	40,613 MT of Slag
iii.Quantity disposed	NA	NA

\* including backlog

**PART - F**

Charateristics of FeMn Slag	Characteristics of GCP Sludge
MnO = 32% to 38%	MnO = 46% to 48%
SiO2 = 20% to 23%	C = 3% to 4%
R2O3* = 21% to 23.5%	R2O3 = 10% to 12%
CaO = 7% to 10%	CaO = 3% to 5%
MgO = 5% to 7%	MgO = 6% to 7.5%

\* R2O3 = (Al2O3 + Fe2O3)

The compositions of other hazardous wastes like Waste Oil & Waste Batteries are Hydrocarbons, lead and used acids.



## **DISPOSAL PRACTICE :**

### **SLAG :-**

Furnace # 1 & Furnace # 2 produce high MnO slag as a by - product, which is a saleable product.

### **SLUDGE :-**

The sludge after being conveyed to the sludge drying beds from the thickner is allowed to dry sufficiently and the dry sludge is then transported to the earmarked sludge-dumping site (a Co's low lying leasehold area) for final disposal. The dumping site is properly fenced and caution board displayed. In order to prevent the sludge getting into the water body flowing in proximity, a retaining wall of size 250Mtrs x 2.5 Mtrs x 0.5 Mtr as well as a garland drain encircling the total sludge dumping site and a 2-stage settling pit have been constructed around the dumping site adjoining the water body as pollution prevention measures .Two Test Wells (as per the specifications of the OPCB) have also been constructed both in the Up stream and in the Down stream in order to monitor the ground water quality near the sludge dumping site. Plantation around the sludge dumping site has also been undertaken having a survival rate of more than 90%.

### **WASTE OIL :**

The waste oil generated at various sources are collected in leak proof barrels and then are kept on an impervious floor with oil catch pit..It is also ensured that the caps of the barrels remain intact and horizontal .The storage area is properly fenced and caution board displayed. During transfer of waste oil to barrels, a trough is placed underneath in order to prevent land contamination due to oil spillage then at a fixed interval, these barrels are returned to stores for final disposal through auction to the authorized party.

### **WASTE BATTERIES :**

Waste Batteries are generated in Electrical section and Garage to the tune of 12 Nos./year(max). These batteries with diluted acid and caps intact are kept under a shed having impervious floor. Then at a fixed interval, these batteries are returned to Stores for final disposal. All storage areas are having sheds have been suitably barricaded and caution board displayed.

### **USED COTTON WASTES:**

The used cotton wastes generated at various locations are kept in designated barrels and at a fixed interval; these wastes are handed over to the Shift In-charge of the Furnace Section for incinerating in the Electric Arc Furnace at a temperature of more than 1100 degree C.

## PART - G

### IMPACT OF THE POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION :

M/s Ferro Manganese Plant, Joda has spearheaded the pursuit for Environmental Protection by implementing an effective environmental management system. To this effect, the Plant has undertaken the following measures:-

- i. Annual maintenance of all four the GCPs including power consumption and sludge transportation is 104 Lakhs (Approx).
- ii. Two Concrete sludge pit was made at a cost of Rs. 90 Lakhs (Approx).
- iii. Annual Maintenance of Fume Extraction System including power consumption is 2 Lakhs (Approx)
- iv. Extensive Plantation in and around the Plant for which the annual expenditure of Rs.6 lakhs was incurred.
- v. Misc.contractual jobs for maintaining environmental management system was Rs.15 lakhs (approx)

So the total annual expenditure incurred towards environmental protection  
= (104+90 + 2 +6+ 15) lakhs = Rs 217 lakhs (approx)

Annual production of the plant during the year = 50,390 MT

So the impact of the pollution abatement measures on the cost of production shall be =  
Rs 217 lakhs / 50,390 MT = Rs 431 / MT (Including new stand by GCP)

Thus the plant is incurring an additional expenditure of Rs 431 / MT of finished product towards pollution control measures.

### PART - H

Environmental Management System in concurrence with the requirements of ISO-14001:2004 standards have been implemented very effectively thro' the following efforts:-

- a. Effective solid wastes management
- b. 100% recycling of waste water
- c. Scheduled water sprinkling of haul roads
- d. Waste dump plantation
- e. Discharging the canteen waste water to Soak Pits thro' settling tank
- f. Imparting EMS training to all the employees
- g. Gas Cleaning Plant
- h. Fume Extraction System at Furnace Tap hole.
- i. Proper handling and management of Hazardous Wastes
- j. Optimization of consumption of natural resources like water & minerals

### PART - I

1. Community awareness development programmes on environmental protection are also undertaken through celebration of World Environment Day and plantation inside and outside the premises.

2. The Plant has been certified to the coveted ISO-14001:2004 (EMS) Certification by IRQS, Mumbai.