

# EXECUTIVE SUMMARY

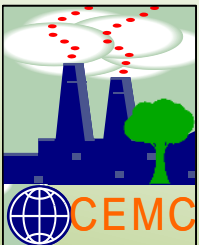
**EXPANSION OF EXISTING PELLET PLANT (FROM 1.2 MILLION TPA TO 6.4 MILLION TPA) WITH MATCHING IRON ORE BENEFICIATION PLANT (6.4 MILLION TPA), PRODUCER GAS PLANT (FROM 75,000 N.CU.M/HR TO 2,00,000 N.CU.M/HR) WITH ADDITION OF NEW SPONGE IRON PLANT (2.0 MILLION TPA), FERRO ALLOYS PLANT (0.036 MILLION TPA) WITH CHROME BRIQUETTE & ZIGGING PLANT, STEEL MELTING SHOP WITH MATCHING LRF, CCM, OXYGEN OPTIMIZED FURNACE (1.8 MILLION TPA) WITH SLAG CRUSHING UNIT, OXYGEN PLANT (400 TPD), ROLLING MILL WITH PICKLING AND CONTINUOUS GALVANIZING LINE (0.35 MILLION TPA), WIRE ROD & WIRE DRAWING MILL (1.4 MILLION TPA) AND CPP 245 MW (120 MW COAL & DOLOCHAR MIX BASED AND 125 MW WHRB BASED)**

FOR

*M/s Orissa Steel & Power Private Limited*  
*(Formerly M/s Rashmi Udyog Pvt. Ltd.)*

Village – Jitusole & Baghmuri, P. O. – Garhsalboni, P. S. – Jhargram,  
District – Jhargram, State – West Bengal

**September 2021**



**Centre for Envotech and Management Consultancy Pvt. Ltd.**

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## **EXECUTIVE SUMMARY**

### **1.0 INTRODUCTION**

#### **1.1 General background**

M/s Orissa Steel & Power Private Limited (Formerly known as M/s Rashmi Udyog Private Limited) a wholly own subsidiary of M/s Rashmi Cement Limited is originally incorporated under Company Act on 16<sup>th</sup> October, 2019 with the name of M/s Rashmi Udyog Private Limited and later on company name is change to M/s Orissa Steel & Power Private Limited on 17<sup>th</sup> November, 2020 having its registered Office at Room No-3B, 1, Garstin Place, Kolkata – 700 001 in West Bengal.

The project was originally accorded environmental clearance in the name of M/s. Rashmi Iron Industries Private Limited Vide Letter no. J-11011/180/2012-IA II (I) dated 22<sup>nd</sup> June, 2015 which was transferred to M/s Rashmi Cement Limited vide letter no. J-11011/180/2012-IA.II (I) dated 04<sup>th</sup> October, 2019.

The same EC was transferred from M/s Rashmi Cement Limited to M/s Rashmi Udyog Private Limited (Wholly own subsidiary of M/s Rashmi Cement Limited) vide letter no. J-11011/180/2012-IA.II (I) dated 28<sup>th</sup> January, 2020.

Subsequently name of company Rashmi Udyog Private Limited changed to Orissa Steel & Power Pvt. Ltd. *(The change in the name of the Company is being undertaken to promote ease of business. This will also enhance company's business.)*

Now the company has proposed for Expansion of Existing Pellet Plant (from 1.2 Million TPA to 6.4 Million TPA) with matching Iron Ore Beneficiation Plant (6.4 Million TPA), Producer Gas Plant (from 75,000 N.Cu.M/hr to 2,00,000 N.Cu.M/hr) with addition of new Sponge Iron plant (2.0 Million TPA), Ferro Alloys Plant (0.036 Million TPA) with Chrome briquette & Zigging plant, Steel Melting Shop with matching LRF, CCM, Oxygen Optimized Furnace (1.8 Million TPA) with slag crushing unit, Oxygen Plant (400 TPD), Rolling mill with pickling and continuous galvanizing line (0.35 Million TPA), Wire Rod & Wire Drawing mill (1.4 Million TPA) and CPP 245 MW (120 MW coal & Dolochar Mix Based and 125 MW WHRB based)" at Village – Jitusole & Baghmuri, P.O. - Garhsalboni, P.S. - Jhargram, District - Jhargram, West Bengal.

Meanwhile the name of the company changed from M/s Rashmi Udyog Private Limited to M/s Orissa Steel & Power Private Limited on 17<sup>th</sup> November, 2020 to promote ease of business, which will enhance company's business. Subsequently, an application was made to ministry as per clause 11 of EIA Notification, 2006 for the name change in EC, where it was changed from M/s Rashmi Udyog Private Limited to M/s Orissa Steel & Power Private Limited by MoEF&CC vide letter no. J-11011/180/2012-IA.II (I) dated 09<sup>th</sup> June, 2021 and conceptually expansion of "Existing Pellet Plant (from 1.2 Million TPA to 6.4 Million TPA) with matching Iron Ore Beneficiation Plant (6.4 Million TPA), Producer Gas Plant (from 75,000 N.Cu.M/hr to 2,00,000 N.Cu.M/hr) with

**Executive Summary for Proposed Expansion of Existing Pellet Plant to Integrated Steel Plant  
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addition of new Sponge Iron plant (2.0 Million TPA), Ferro Alloys Plant (0.036 Million TPA) with Chrome briquette & Zigging plant, Steel Melting Shop with matching LRF, CCM, Oxygen Optimized Furnace (1.8 Million TPA) with slag crushing unit, Oxygen Plant (400 TPD), Rolling mill with pickling and continuous Galvanizing line (0.35 Million TPA), Wire Rod & Wire Drawing mill (1.4 Million TPA) and CPP 245 MW (120 MW coal & Dolochar Mix Based and 125 MW WHRB based)" for which TOR is granted by ministry vide File No. J-11011/180/2012-IA-II (I) dated 04<sup>th</sup> March, 2021 is deemed to be read in favour of M/s Orissa Steel & Power Private Limited.

Project is for expansion of existing pellet plant (1.2 Million TPA) to Integrated Steel Plant (1.75 Million TPA finished steel) by adopting DRI-IF/EAF Route with installation of additional 245 MW CPP. The area will be expanded from 51 to 140 acres. Cost of expansion project will be ₹ 1500 Crores.

Sl. No.	Units	As per EC dated 22.06.2015, 04.10.2019, 28.01.2020 & 09.06.2021		Expansion Proposal considering 350 annual working days		Ultimate Configuration		Product
		Configuration	Capacity	Configuration	Capacity	Configuration	Capacity	
1	DRI	**	**	5 x 900 TPD	2.0 Million TPA	5 x 900 TPD	2.0 Million TPA	Sponge Iron
2	Steel Making Facilities with matching LRF,CCM and Oxygen optimized furnace	**	**	(8 x 30 T + 2 + 40 T) IF + 1 x 60 T EAF	1.8 Million TPA	(8 x 30 T + 2 x 40 T) IF + 1 x 60 T EAF	1.8 Million TPA	Billets, Slab
3	Slag Crusher	**	**	4 x 25 TPH	100 TPH	4 x 25 TPH	100 TPH	Metal Recovery
4	Oxygen Plant	**	**	2 x 200 TPD	400 TPD	2 x 200 TPD	400 TPD	Oxygen
5	Ferro Alloy Plant	**	**	3 x 9 MVA	36,000 TPA	3 x 9 MVA	36,000 TPA	Ferro Alloys (FeMn, FeSi, SiMn & FeCr)
6	Jigging Plant	**	**	3 x 30 TPD	90 TPD	3 x 30 TPD	90 TPD	Metal Recovery
7	Chrome Briquette Plant	**	**	1 x 20 TPH	20 TPH	1 x 20 TPH	20 TPH	Chrome Briquette
8	Rolling Mill with Pickling line & Continuous Galvanizing line	**	**	**	0.35 Million TPA	**	0.35 Million TPA	H.R Plate, Galvanized Sheets
9	Wire Rod Mill and Wire Drawing	**	**	**	1.4 Million TPA	**	1.4 Million TPA	TMT Bar, Wire & Wire Rod
10	Pellet Plant	2 x 0.6 Million TPA	1.2 Million TPA	2 x 2.2 Million TPA	4.4 Million TPA	(2 x 1.0 + 2 x 2.2) Million TPA	6.4 Million TPA	Iron Ore Pellet
	Enhancement in pellet plant capacity			2 x 0.6 Million TPA to 2 x 1.0 Million TPA	2.0 Million TPA			
11	Matching I/O Beneficiation	1 x 1.5 Million TPA	1.5 Million TPA	2 x 2.45 Million TPA	4.9 Million TPA	1 x 1.5 + 2 x 2.45 Million TPA	6.4 Million TPA	Concentrated Iron Ore
12	Producer gas Plant	10 x 7500 Nm <sup>3</sup> /hr	75,000 Nm <sup>3</sup> /hr	10 x 12,500 Nm <sup>3</sup> /hr	1,25,000 Nm <sup>3</sup> /hr	(10 x 7500 + 10 12,500) Nm <sup>3</sup> /hr	2,00,000 Nm <sup>3</sup> /hr	Producer Gas
14	Captive Power Plant	**	**	WHRB Based 125 MW from DRI Plant + CFBC (Coal Dolochar mix based) 2 x 60 MW)	245 MW	WHRB Based 125 MW from DRI Plant + CFBC (Coal Dolochar mix based) 2 x 60 MW)	245 MW	Power

## 1.2 Location and communication

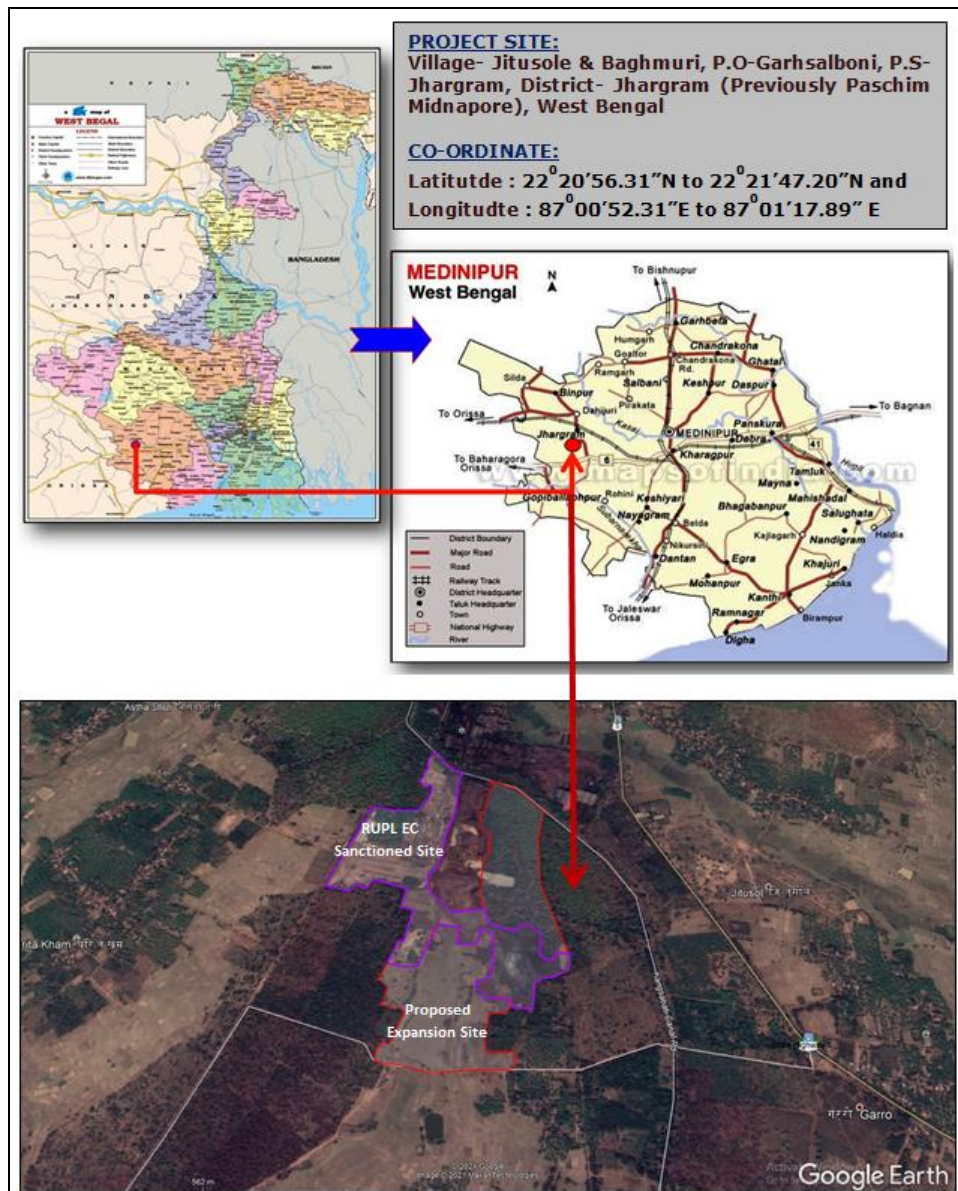
The proposed plant, after expansion will fall in villages – Jitusole & Baghmuri, P.O. – Garhsalboni, P.S. – Jhargram, District – Jhargram, West Bengal. The location of plant is given in **Fig. No. 1**. The outermost co-ordinates of various parts of the proposed plant, based on google earth, are:

Site	Latitude	Longitude
<b>Existing Project Boundary</b>		
Point a	22°21'33.83"N	87°00'57.89"E
Point b	22°21'36.63"N	87°00'58.26"E
Point c	22°21'38.85"N	87°00'56.73"E
Point d	22°21'40.10"N	87°00'58.67"E
Point e	22°21'42.35"N	87°00'59.63"E
Point f	22°21'45.06"N	87°00'59.57"E
Point g	22°21'47.20"N	87°01'00.86"E
Point h	22°20'58.39"N	87°01'03.43"E
Point i	22°21'50.16"N	87°01'01.53"E
Point j	22°21'44.13"N	87°01'02.73"E
Point k	22°01'02.34"N	87°01'02.30"E
Point l	22°21'38.74"N	87°01'02.30"E
Point m	22°21'35.97"N	87°01'02.19"E
Point n	22°21'34.47"N	87°01'00.95"E
<b>Expansion Project Boundary</b>		
Point A	22°21'48.30"N	87° 1'8.41"E
Point B	22°21'43.22"N	87° 1'6.83"E
Point C	22°21'36.21"N	87° 1'7.30"E
Point D	22°21'31.09"N	87° 1'6.77"E
Point E	22°21'27.15"N	87° 1'7.88"E
Point F	22°21'25.95"N	87° 1'11.40"E
Point G	22°21'26.68"N	87° 1'11.62"E
Point H	22°21'25.58"N	87° 1'14.31"E
Point I	22°21'22.80"N	87° 1'14.12"E
Point J	22°21'22.16"N	87° 1'15.35"E
Point K	22°21'23.05"N	87° 1'17.42"E
Point L	22°21'32.35"N	87° 1'14.49"E
Point M	22°21'38.99"N	87° 1'14.47"E
Point N	22°21'43.08"N	87° 1'15.34"E
Point O	22°21'46.84"N	87° 1'11.84"E
Point P	22°21'21.74"N	87° 0'55.74"E
Point Q	22°21'21.53"N	87° 0'59.39"E
Point R	22°21'26.88"N	87° 1'1.56"E
Point S	22°21'25.36"N	87° 1'8.59"E
Point T	22°21'20.14"N	87° 1'8.05"E
Point U	22°21'19.37"N	87° 1'6.26"E
Point V	22°21'17.66"N	87° 1'7.28"E
Point W	22°21'17.08"N	87° 1'10.57"E

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Point X	22°21'15.61"N	87° 1'9.86"E
Point Y	22°21'15.51"N	87° 1'7.74"E
Point Z	22°21'11.41"N	87° 1'7.44"E
Point AA	22°21'11.26"N	87° 1'10.42"E
Point AB	22°21'9.30"N	87° 1'9.88"E
Point AC	22°21'9.09"N	87° 1'0.81"E
Point AD	22°21'10.44"N	87° 0'55.07"E
Point AE	22°21'15.94"N	87° 0'57.98"E

The project site is well connected to NH-6 & SH-5. Nearest city to the project site is Jhargram (~9.5 km in NW direction). Nearest Railway Station is Jhargram Railway Station (~10.5 km in NW direction) and nearest airport is Netaji Subhash Chandra Bose International Airport, Kolkata (~150 km in W direction).



**Fig No. 1: Location Map**

## **2.0 PROJECT DESCRIPTION**

### **2.1 Plant layout**

The land use of the core area will be changed during the construction and the operation phases. Land use of the entire project area will be changed from Undeveloped / No Forest land to industrial use. The total land requirement for the integrated steel plant is 140 acres land. During construction phase, parts of the project area will be converted into internal roads, water reservoir, buildings, colony, green belt and plantation, etc. The proposed layout map is shown in **Fig. No. C2-1** of Chapter-2.

### **2.2 Process Description**

**Pellet Plant (1.2 to 6.4 MTPA):** The pellet plant will produce oxide pellets suitable for use in D.R.I. and blast furnace. Pellets are heat hardened balls produced from concentrates and natural iron ores of different mineralogical and chemical composition. The pellets have improved properties for iron making. Pelletization process involves feed preparation, green ball formation, pellet induration and product dispatch.

**Direct reduced iron (D.R.I.) Plant (2.0 MTPA):** Main raw materials - iron ore/Pellet, coal and dolomite are fed to the ground hoppers with the help of pay loaders and tippers. They are carried away by belt conveyors to the crusher house and thereafter fed to kiln. Iron ore is reduced by heating with coal in the rotary kiln at a temperature of about 1000°C. After reduction, products are cooled in a drum type rotary cooler. Product is then separated into D.R.I. or sponge iron and char by magnetic separation. In rotary cooler, product is cooled by indirect water spray.

**Ferro Alloy Plant (36,000 TPA):** Ferro manganese, Silico Manganese, Ferro Chrome or ferrosilicon is used to make various grades of stainless steel. The process comprises continuous smelting of manganese / Chromium ore, coke and coal and quartz in smelting electric furnace (Submerged Arc Furnace - SAF) 36000 TPA ferroalloys will be produced from the 3 x 9 MVA furnaces. During smelting operations, solid charge like ore, coal and quartz will be transformed into liquid form as metal and slag.

**Steel melting shop (1.8 MTPA):** Steel melting shop will have 8X30 tonne, 2x40 tonne induction furnaces (IF) and 1 x 60 tonne Electric Arc Furnace (EAF). Induction furnace works on the principle of induction melting of scrap/ sponge iron with the help of electric power. In the electric arc furnace, electric arc is generated between electrodes, which heat the metallic charge. In both furnaces, the melted contents separate into liquid metal and slag. The slag is removed and considered as waste. The liquid metal is sent to the continuous casting machine (C.C.M.) where semi-finished product is made.

**Rolling mill (1.75 MTPA):** Semi-finished product from the continuous casting machine of induction furnace and electric arc furnace as well as from outside purchase will be reheated and converted into finished products such as TMT, Flat, Round, Wire Rod, Structural and others products.

**Captive Power Plant (CPP): (1) Waste Heat Recovery Boiler:** 125 MW waste heat recovery boilers based power plant is proposed to utilize the heat from gases exiting DRI kilns. **(2) AFBC/ CFBC:** 120 MW (2 x 60 MW) power plant based on coal and char from DRI kilns has been proposed. The power generated from the CPP will meet the requirement of the steel plant.

For material handling within plant premises a coal handling system, ash handling system, roads etc shall be provided. Water requirement in various locations within the plant will be supplied through a circulating water system with a cooling tower, make up water system and blow down system.

### 2.3 Raw material, power and water

Major raw material and fuel requirement for project will be various grades of iron ore (private mines), non-coking coal (domestic/Import). Other raw material required is Manganese / Chromium Ore, limestone, dolomite, bentonite, quartz, silica, pig iron and semi-finished products. Fuels required in various units will be non-coking coal, coke breeze & fines, low sulphur heavy stock diesel oil/ furnace oil.

#### Raw Material Requirement:

Sl. No.	Name of the Raw Materials	Requirement as per table given in TOR – Details submitted by Project Proponent (Point 7)			Revised raw material requirement for existing & proposed expansion as per configuration given in Table considering 350 days – Written submission during the course of meeting (Point 15)	Source
		Existing for EC awarded Project	Additional for expansion Unit	Total	Quantity (TPA)	
1	Iron Ore Fines	15,00,000	49,92,000	51,42,000	81,11,330	Applied for captive iron ore mines Alternate source: Purchased from Barbil-Joda, Orissa
2	Iron Ore Lumps	---	1,00,000	1,00,000		
3	High Graded Iron Ore	---	3,45,810	3,45,810		
4	Pig Iron	---	2,75,100	2,75,100	2,94,300	From other unit of associate company
5	Non - coking coal	1,44,000	26,26,800	27,70,800	29,42,800	CCL, MCL & Imported Coal. Also, applied for captive Coal mines (Jagnnathpur - B, (Raniganj Coal field West Bengal), vesting order from MOC, Govt. of India obtained.
6	Coke	---	23,400	23,400	23,400	Imported, E-Auction

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7	Dolomite	---	1,23,130	1,23,130	1,21,080	From Birmiritrapur, Orissa / Bilaspur, CG
8	Bentonite	40,000	80,000	1,20,000	1,28,000	From Gujarat, Rajasthan
9	Limestone	26,000	2,09,060	2,35,060	2,53,150	From Birmiritrapur, Orissa / Bilaspur, Raipur CG / Katni MP
10	Manganese Ore	---	93,600	93,600	93,600	From Balaghat, MP & Orissa
11	Chromium Ore	---	79,200	79,200	79,200	Orissa, Jharkhand etc.
12	Quartzite	---	9,000	9,000	9,000	From Belpahar Orissa / Bilaspur, Raipur CG
<b>Total</b>			<b>93,17,100</b>		<b>1,19,76,660</b>	-

The existing power requirement of the project is 8 MW. Additional 324.9 MW will be required for the expansion project. The total power requirement of the project shall be 332.9 MW. 245 MW will be sourced from Captive Power Plant & balance 87.9 MW from State Grid power supply system.

The total water requirement for 1.75 million tonne per annum Integrated Steel plant will be 320 m<sup>3</sup>/hr. It shall be sourced from Subarnarekha River, Jhargram Municipality supply system, ground water and rain water harvesting pond.

#### **2.4 Manpower**

The manpower requirement for the sanctioned capacity is 169 persons (69 Regular + 100 Contractual). Additional 3000 person (1,000 Regular + 2,000 Contractual) will be required for the proposed expansion. The total manpower for the 1.75 MTPA plant will be 3,169 persons. Several others around 1200 indirect employment opportunities will be created in the surrounding areas by transport, business, vehicle drivers and attendants, workshops, grocery and retails, medical, etc.

#### **2.5 Site services**

Infrastructure facilities such as administrative office, rest rooms, canteen, first aid centre, etc. will be provided to employees.

### **3.0 PRESENT ENVIRONMENTAL SCENARIO**

The project area has been referred to as the "core zone" while the area upto 10 km radius of the project has been referred to as the "buffer zone".

#### **3.1 Topography and drainage**

**Topography:** The topography of the project site and its buffer zone is undulating. The highest altitude is 115 m above mean sea level (msl) and the lowest altitude is 45 m above msl. The general slope of the land in the study area is towards east/southeast. The topography of the project site is plain with general elevation ranging from 68 m to 86 m above msl. The topographic features of the study area may be seen from Survey of India OSM Nos. F45I15 & F45J3.



**Drainage:** The area is drained by Subarnarekha, Kasai and their tributaries. Drainage in the district is controlled by structural weak planes i.e., lineaments and they are effluent in nature. The drainage pattern of the area is mainly contributed by Kangsabati and Subarnarekha Rivers. Kangsabati River flows at a distance of 13.5 km from the project site in North East direction and Subarnarekha River flows at a distance of 15.0 km from the project site in South West direction. Kangsabati canal flows at a distance 3.5 km in NE from the project site which provides water for irrigation in the area.

### **3.2 Climate and micro-meteorology**

The climate of region is mainly sub-tropical type. Monthly average of minimum temperatures recorded at IMD station Midnapore, ranges from 9.9°C to 24.1°C and maximum temperature ranges from 28.9°C to 41.3°C, total of annual rainfall is 1569.0 mm and average wind speed is 4.3 km/hr.

The micro meteorological data of the core zone has been recorded using an automatic weather station from March 2021 to May 2021. The temperature ranged between 17.0°C to 41.3°C and relative humidity ranged between 44.0 % to 68.0 % during the monitoring period.

The wind speed varied between calm to 12.5 km/hr and the predominant wind direction was observed from South.

### **3.3 Ambient air quality**

Ambient air quality study was monitored at 8 locations including one location in the core zone (expansion area). Seven locations in the buffer zone are in village Jitusole, Shalboni, Jualbhanga, Jaygera, Shilmi, Lodhasuli and Mohanpuri. Twenty four hour P<sub>98</sub> values of PM<sub>10</sub> level was found to range from 66.9 to 80.1 µg/m<sup>3</sup>, PM<sub>2.5</sub> was found to vary from 43.4 to 50.8 µg/m<sup>3</sup>, SO<sub>2</sub> from 6.4 to 15.3 µg/m<sup>3</sup> and NO<sub>x</sub> from 12.3 to 18.1 µg/m<sup>3</sup>. The concentration of carbon monoxide, O<sub>3</sub>, Nickel, Arsenic, Lead, B(a)P and Benzene were also measured & found below the permissible limits.

### **3.4 Water resource and quality**

Ground Water Quality study was monitored at 8 locations including one location in the core zone (expansion area). Seven locations in the buffer zone are near village Jitusole, Shalboni, Lodhasuli, Labkhush, Nauria, Ghritakham and Bagmuri. It is observed that the physico-chemical parameters present in ground water are within the permissible limits specified by IS: 10500:2012 for drinking purposes.

Water samples were collected from 8 surface water sources. These are (1) Pond near Kamar Bandi Village, (2) Pond near Lukhapara village (3) Pond near Jualbhanga village, (4) Pond near Baria village, (5) Pond near Banshda village, (6) Pond near Malapara village, (7) Pond near Kendudisal village, (8) Pond near Kismat Debi village. The analysis of surface water sample shows that all the parameters are within the permissible limits as per IS 2296/1982.

### **3.5 Land use pattern and soil quality**

Total land required for the expansion project is 140.0 acres. 80 acres land is already in possession of M/s Orissa Steel & Power Private Limited (M/s Rashmi Udyog Private Limited) and for the remaining 60 acres land mutual agreement obtained from private rayat.

Top soil samples were collected and analyzed from 8 locations in and around plant premises. The results indicate that all the soil samples are medium grained sand and have pH between 6.1-6.9.

### **3.6 Noise and traffic volume survey**

Noise levels at eight stations (1 within the core area and seven within buffer area) were observed. Leq values observed during day time varied from 49.7 to 69.8 dB (A) and at night time varied from 39.9 to 59.6 dB (A). Traffic volume survey was conducted at National Highway-6 Road near Lodhasuli Chowk at a distance of 3.5 from plant. Total number of motorised vehicles and cycles were found 3,632 nos.

### **3.7 Ecology**

Biodiversity is the degree of variation of life forms within a given ecosystem, biome, or an entire planet. Biodiversity is a measure of the health of ecosystems. Greater biodiversity implies greater health. Biodiversity is in part a function of climate. The Biological environment is intended to cover the prevalence of all living forms (plants and animals) in the study area and the impact of them if any, due to operation of the proposed Project. In this study on enumeration of plant species with their dominance of the section of the study area along with available aquatic terrestrial fauna are recorded. Listing of all living forms are included with all living species starting from micro-organism, plant and animal in addition to domestic and wild animal seen in the study area during the field visit and as informed by the local people.

### **3.8 Socio-economic conditions**

There is no habitation within the project area. The total population within the study area is 52453.

The SC population is 9.0% and ST population is 28.0%. The literacy level is approximately 64.84% and it is lower among females (28.56%). There are 999.6 women against every 1000 men in the study area.

### **3.9 Places of archaeological/ historical/ tourist/ religious importance**

There is no important archaeological (ASI)/historical place or other place of tourist or religious importance within the study area except village temples and mosques.

## **4.0 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION**

### **4.1 Topography and drainage**

**Impact:** Change in topography is occurring in core zone due to cutting, filling, construction activities such as walls, buildings, stock yards, etc. for the plant sanctioned vide environmental clearances dated 22.06.2015, 04.10.2019, 28.01.2020 & 09.06.2021. Land requirement for existing project is 51 acres and additional 89 acres land required for expansion project so total land requirement is 140 acres. The topography will change permanently due to leveling and establishment of additional buildings. The construction once achieved will not be reversed. There will be no impact on topography of the buffer zone since no construction is proposed except widening and strengthening of road.

Impact on the drainage in the buffer zone is not anticipated as no construction will be taking place outside plant boundary. However, the volume of water from the plant area going outside the plant will reduce during rainfall as the rainwater will be stored in raw water reservoir / rain water harvesting ponds.

**Mitigation:** The change in topography in the core zone will be permanent and irreversible. Excavated soil will be used in levelling, filling and landscaping to minimise the impact of change in topography. Changes in the sheet flow pattern of rain water will be managed through storm water drains. The impact of the new construction will, therefore, be managed through mitigation measures.

### **4.2 Air quality**

**Impact:** During construction phase, sources of air pollution will be due to vehicle exhausts, excavation work, construction material handling (cement, sand and gravel), vehicle movement on unpaved roads and exhaust from non-mobile construction equipment like compressors. Primary impact will be high dust generation resulting into increased suspended particulate matter levels in the surrounding areas. This will affect the health of the labour force working in close vicinity and nearby villagers. During operation phase the air quality impact will be due to emissions from the stacks attached to various units, from stock yards and from transportation. Each of these has been evaluated for potential impact using mathematical models.

**Mitigation:** During construction, dust. It will be controlled by sprinkling of water and using covers & wind breaks. All trucks that will be used for transportation of construction material, raw material and finished product will be covered with tarpaulin, kept maintained, be optimally loaded, be spill proof and have Pollution-Under-Check (PUC) certificates. Various pollution control equipment like electrostatic precipitators (E.S.P.), bag filters, dust extraction systems, dry fog systems, gas cleaning plant, scrubber and sprinklers shall be installed as per the requirement of every unit. The air quality prediction exercise was carried out for stack emissions and from vehicular movement. The maximum incremental ground level concentrations for proposed expansion

project with control measures has been calculated as 3.7  $\mu\text{g}/\text{m}^3$  for  $\text{PM}_{10}$ , 5.0  $\mu\text{g}/\text{m}^3$  for  $\text{SO}_2$  and 4.7  $\mu\text{g}/\text{m}^3$  for  $\text{NO}_x$ . The maximum incremental ground level concentration for proposed expansion and unimplemented project of RCL (Steel & Power) project will be 6.6  $\mu\text{g}/\text{m}^3$  for  $\text{PM}_{10}$ , 5.5  $\mu\text{g}/\text{m}^3$  for  $\text{SO}_2$  & 5.4  $\mu\text{g}/\text{m}^3$  for  $\text{NO}_x$ . The impact of the plant will remain within permissible limits.

#### **4.3 Noise and traffic density**

**Impact:** The noise level during construction will be due to construction machinery. It will be temporary and reversible in nature. The noise level at sources like plant machinery are anticipated to go as high as 90 dB(A). During operation, noise will be generated due to operation of various equipment, machinery, pumps, turbo generators, etc.

**Mitigation:** The equipment shall be provided with acoustic shields or enclosures to limit the sound level within the plant boundary. Vibration dampers shall be used during erection of machinery. Maintenance of machinery and vehicles will be done regularly. The proposed green belt will also help to prevent noise generated within the plant from spreading beyond the plant boundary. Ear muffs or plugs will be provided to the workers in close vicinity of noise source.

#### **4.4 Water environment**

**Impact:** During construction phase, water will be required for concrete mixing, curing, cooling water for various machineries, sprinkling for dust suppression, green belt and lawns development. Sewage will be generated from site office and labour camp.

During operation phase, the requirement of water will be for process and sourced from Subarnarekha River, Jhargram Municipality Supply System, Ground water & Rainwater Harvesting Pond. The withdrawal of water from Subarnarekha River can also have an impact in absence of mitigation measures. Waste water will be generated after expansion from DM unit regeneration; water pre-treatment; discharges from various units like CPP, kilns, furnaces, etc.; plant washings; leakages and sewage from buildings. During monsoon there will be run off from stock yard, solid waste storage area, roads, open areas and roof tops.

**Mitigation:** During construction phase, the sewage from site office and labour camps will be treated in septic tank- soak pit system. During operation, waste water streams from various units, processes and services of the plant will be collected in neutralisation tank (if needed) and common monitoring basin. From common monitoring basin, it will be utilized for dust suppression, sprinkling, ash quenching and green belt. The sewage from toilets, washrooms and canteen of plant shall be treated in de-centralised septic tanks and sewage treatment plant.

The rainwater falling within the entire project area will be routed to the raw water reservoir and/or intermediate rainwater harvesting ponds through storm water drains. This will reduce water demand from the Subarnarekha River. Rooftop rainwater will be recharged to the ground. The run off from stock yards and solid waste storage areas will be guided to settling chambers prior to discharge into rainwater harvesting ponds or raw water reservoir.

#### **4.5 Land use**

**Impact:** The total plant area of proposed expansion project will be spread over 140 acres. It comprises of internal roads, water reservoir, buildings, green belt and plantation, etc. During expansion, additional buildings and sheds of the new units will come up along with facilities. The temporary storage of solid wastes like char, ESP & bag filter dusts, sludges, FES dust, various slags from various sub-units, fly ash and other solid wastes on land would also impact the land.

**Mitigation:** The topsoil generated during construction will be preserved and shall be spread over the area where plantation is proposed. Plantation will be carried out at earliest to minimise soil erosion. To prevent contamination of water and soil, the finished product stock yards will be covered. Raw material stock yard and solid waste storage areas will have impervious flooring to prevent seepage of leaching due to rains. Runoff will be collected in a garland drain around the stock yard & solid waste storage areas, settled in settling pond and directed to rain water harvesting ponds or raw water reservoir.

#### **4.6 Solid waste**

**Impact:** During construction phase, due to work force deployed for construction, there will be development of temporary establishment of residential and commercial nature. These will generate garbage. In the proposed plant operation dust collected from dust collectors, empty barrels (metal and plastic), bags, fly ash, bed ash, dust from air pollution control equipment, dolochar, E.A.F. & I.F. slag, mill scale, scrap, rejected billets, coal fines & rejects, Iron ore fines, effluent treatment sludges, sweepings and other biodegradable wastes from the canteen are the solid wastes generated.

**Mitigation:** Sponge iron kilns ESP dust and dolochar will be used as fuel in power plant. The E.A.F. and I.F. slag will be given for metal recovery, converted into aggregates and used for road making. Mill scales, iron ore fines and various E.S.P. & bag filter dusts will be used for sinter making in associate company. Steel scraps and rejects will be recycled by melting. Fly and bottom ash from proposed power plant shall be used for in house brick making and balance given to cement plants, brick plants, road projects & other users. All stock piles will be laid on top of a stable liner to avoid leaching of materials to ground water.

#### **4.7 Ecology**

**Impact:** During construction and operation phase, negligible impact is anticipated on the flora in the plant area. There is no forest land involved in the total plant area of 140 Acres. Negligible adverse impact of proposed project is anticipated on the fauna. The air quality modeling shows that negligible impact will be caused on the surrounding forests

**Mitigation:** Under the proposed green belt and plantation programme after expansion, 46.2 acres of land (33% of total area) shall be provided with green cover. The greenbelt will act as a micro-habitat for mammals and birds. Company also proposes extensive plantation outside the plant boundary.

#### **4.8 Socio-economics**

**Impact:** Most of the work force required for construction and operation of the proposed project will be drawn from the surrounding areas. Once the plant will commence operation, amenities like education, school, health, medical, entertainment, canteen, etc. will get developed in and around the plant. These facilities will inevitably be available to local people also in addition to those directly associated with the plant. During operation phase, 3169 people will be employed at full capacity of 1.75 million tonne.

**Mitigation:** It is proposed to hire the manpower locally in the proposed plant, to the extent possible in order to have a positive socio-economic impact. For the purpose, training for capacity building shall be undertaken by the company. Land owners from whom land has been bought, will be given preference in employment. Other than direct and indirect employment leading to economic growth, the major benefit to the community will be through Corporate Social Responsibility (C.S.R.) activities of the company.

#### **5.0 ANALYSIS OF ALTERNATIVES**

The company has proposed for Expansion of Existing Pellet Plant (from 1.2 Million TPA to 6.4 Million TPA) with matching Iron Ore Beneficiation Plant (6.4 Million TPA), Producer Gas Plant (from 75,000 N.Cu.M/hr to 2,00,000 N.Cu.M/hr) with addition of new Sponge Iron plant (2.0 Million TPA), Ferro Alloys Plant (0.036 Million TPA) with Chrome briquette & Zigging plant, Steel Melting Shop with matching LRF, CCM, Oxygen Optimized Furnace (1.8 Million TPA) with slag crushing unit, Oxygen Plant (400 TPD), Rolling mill with pickling and continuous galvanizing line (0.35 Million TPA), Wire Rod & Wire Drawing mill (1.4 Million TPA) and CPP 245 MW (120 MW coal & Dolochar Mix Based and 125 MW WHRB based).

As per EC accorded project, 2 X 0.6 Million TPA pellet plant, 1.5 million TPA I/O beneficiation plant along with 10 x 7,500 Nm<sup>3</sup>/Hr Producer gas plant is ready for operation. Therefore, no alternative site has been selected. It is intended to expand the plant into adjoining or nearby areas and share the resources and facilities of the sanctioned plant. For steel making, the Induction Furnace (I.F.) technologies have been selected. For the captive power plant, waste heat recovery boiler & CFBC boiler is proposed. Based on the techno-economic

analysis and operating experience of existing pellet plants, grate kiln process has been selected.

## **6.0 ENVIRONMENTAL CONTROL AND MONITORING ORGANISATION**

M/s Orissa Steel & Power Private Limited (Formerly M/s Rashmi Udyog Private Limited) already has an Environment Management Department at the Headquarter as well as plant site. It will also be responsible for ensuring the environmental monitoring of the proposed plant. Monitoring of stack emissions, ambient air quality, water quality, water levels, noise levels, soil quality, tree count, etc. shall be carried out periodically at plant level. An environment officer has already been appointed at plant. He will be responsible for the aforementioned plant level monitoring, developing greenbelt, ensuring good housekeeping, ensuring statutory compliances as well as imparting environmental training to work force. The capital cost of environmental mitigation measures for EC awarded project is 12.43 crores and for expansion project is estimated to be Rs. 150.0 crores.

## **7.0 DISASTER MANAGEMENT PLAN**

All types of industries face certain types of hazards which can disrupt normal activities abruptly. They can lead to disasters like fires, inundation, failure of machinery, explosion, oil spillage, acid spillage, electrocution and hazardous waste spillage/ exposure, etc. Disaster management plan is formulated with an aim of taking precautions to control hazard propagation and avert disaster. It also instructs to take action after the disaster to limit the damage to minimum. To tackle the situation, a disaster control room will be established having links with all control rooms of the plant. An up-to-date communication facility will be provided to control rooms. The disaster control room shall be headed by emergency leader called Site Main Controller, who will be the plant manager.

## **8.0 PROJECT BENEFIT**

During operation phase, around 3169 persons will be under direct employment of the company at full capacity. Many more persons will be indirectly engaged either on contract basis or in transportation of materials or in provision of different services associated with the project. As majority of unskilled and semi-skilled persons will be from the surrounding villages, social & infrastructural benefits will extend to the local population. Improvement is expected in education facilities, health care services, road infrastructure and drinking water facilities through proposed Corporate Environmental Responsibility (CER).

## **9.0 DISCLOSURE OF CONSULTANTS**

The consultant engaged for the preparation of the EIA/EMP of the project is M/s Centre for Envotech and Management Consultancy Pvt. Ltd. (CEMC), Bhubaneshwar, Odisha. CEMC is one of the leading Environmental and Forest consultancy organisations in the state of Odisha. CEMC was established during 2005 and registered under Companies Act 1956 and is NABET, QCI accredited consultant.