EXECUTIVE SUMMARY

OF

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PLAN

FOR

PUBLIC HEARING

OF

Charge Chrome Plant

Expansion of Ferro Alloy Plant for High Carbon Ferro Chrome Production from 1,45,000 TPA (1 x 45 MVA & 1 x 33 MVA SAF) to 4,45,000 TPA (1 x 45 MVA, 1 x 33 MVA & 2 x 75 MVA SAFs), 11,800 TPA MRP along with New Installation of Raw Material Handling Facility and 7,00,000 TPA Pellet & Sintering Plant

At

Village- Randia, P.S-Bhadrak Rural, District-Bhadrak, Odisha

APPLICANT

M/s Ferro Alloys Corporation Limited

Regd. Office: D.P. Nagar,

PO: Randia, Bhadrak, Odisha - 756135

Phone -+91 6784 240320,

Email: facor.mines@vedanta.co.in

EXECUTIVE SUMMARY

1.0 PROJECT DESCRIPTION

M/s Ferro Alloys Corporation Limited is currently operating 1,45,000 TPA Charge Chrome/ High Carbon Ferro Chrome (Electric Arc Submerged Arc Furnace of 45 MVA & 33 MVA) and 11,800 TPA Charge Chrome (Metal Recovery Plant) at Village-Randia, District-Bhadrak, Odisha.

The company has obtained Environment Clearance vide EC Identification No.EC22A008OR193113 dated 31st October, 2022 for Expansion of Ferro alloys Plant High Carbon Ferro Chrome production from 75,000 TPA (from 1 x 45 MVA SAF) and 6,300 TPA from MRP up to 1,45,000 TPA (from 1 x 45 MVA & 1 x 33 MVA SAF) and 11,800 TPA from MRP.

The company obtained Consent to establish for the same from Odisha State Pollution Control Board, vide CTE No. 23163 dated 14.12.2022 valid till 13.12.2027 and the Consent to operate permission was obtained from Odisha State Pollution Control Board for 1,45,000 TPA Charge Chrome/ High Carbon Ferro Chrome (Electric Arc Submerged Arc Furnace of 45 MVA & 33 MVA) and 11,800 TPA Charge Chrome (Metal Recovery Plant) vide CTO No. 7239/IND-I-CON-5461 dated 04.05.2023.

1.1 PROJECT NAME & LOCATION DETAILS

Now the company is proposing an Expansion of Ferro Alloy Plant for high carbon ferro chrome production from 1,45,000 TPA (1 x 45 MVA & 1 x 33 MVA SAF) to 4,45,000 TPA (1 x 45 MVA, 1 x 33 MVA & 2 x 75 MVA SAFs), 11,800 TPA MRP along with new installation of new raw material handling facility and 7,00,000 TPA Pellet & Sintering Plant within plant premises.

For the above mentioned project, the ToR Letter was issued by MoEFCC, New Delhi vide their letter no. J-11011/594/2008-IA.II(I)(IND–I)&ToR Identification No.TO23A1005OR5639689N dated 08.11.2023.

As per EIA Notification dated 14th Sept., 2006 and subsequent amendments, the project falls under Category “A” S. No. 3 (Material Production), Project Activity ‘3(a)’ Metallurgical Industries (ferrous & non-ferrous).

The project is located at Randia Village, Bhadrak Taluk & District, Odisha.

- Latitude - 21°3’40.16” N to 21°4’16.96” N
- Longitude- 86°27'16.69"E to 86°27'59.59” E
- Toposheet No. –F45O8

2.0 DETAIL OF EXISITNG PROJECT AND EXPANSION PROPOSAL WITH PRODUCT DETAILS

S. No.	Plant Equipment /Facility	Existing Facilities as per EC J-11011/594/2008-IA. II(I) dated 31st October, 2022		Proposed Unit		Total (Existing + Proposed)		Status of units	Product
	Name	Configuration	Production (TPA)	Configuration	Production (TPA)	Configuration	Production (TPA)		
1.	Submerged Arc Furnace (SAF)	1 x 45 MVA + 1 x 33 MVA	1,45,000 TPA	2 X 75 MVA	3,00,000 TPA	1 X 45 MVA + 1 X 33 MVA + 2 X 75 MVA	4,45,000 TPA	1 x 45 MVA + 1 x 33 MVA	High Carbon Ferro Chrome
2.	Metal Recovery Plant (MRP)	1 No.	11,800 TPA	-	-	1 No.	11,800 TPA	11,800 TPA MRP	Recovered metal
3.	Pellet & Sintering Plant	-	-	1 x 7,00,000 TPA	7,00,000 TPA	1 x 7,00,000 TPA	7,00,000 TPA	-	Pellet

Source: *Pre-feasibility Report*

3.0 REQUIREMENT OF LAND, RAW MATERIAL, WATER, POWER, FUEL WITH SOURCE OF SUPPLY (QUANTITATIVE)

a) Land Requirement

The existing plant area is 83.16 hectares (205.5 acres); no additional area required for the proposed expansion project. Hence after expansion, the total plant area will be 83.16 hectares (205.5 acres).

Existing plant area is 83.16 Ha and out of which ~34.84 % of the plant area is demarcated as greenbelt (i.e.,28.99 Ha) no additional area will be required, greenbelt area will be same.

Total 43,605 numbers of trees were planted in the allocated land with a density of 1504 trees per hectare. To increase the density of the greenbelt, the remaining no. of trees will be planted inside the plant premises @2500 trees per hectare.

b) Raw Material Requirement

The basic raw material for the manufacturing of High Carbon Ferro Chrome is being/will be sourced from captive mines. Details regarding quantity of raw materials required their source along with mode of transportation for proposed expansion project have been tabulated below:

Raw Materials Requirement, Source & Transportation

S. No.	Required Raw Material	Estimated quantity (in TPA)			Source of Raw Material	Mode of Transportation	Distance from Plant Site
		Existing	Additional	Total after Expansion			
I	**Ferro Alloy Plant**						
1.	Coke	92,100	1,50,300	2,42,400	Neelanchal, Krishna Coke & Mother & Son Agency	By Road	25to 65 km
2	Chrome ore fines	3,00,000	0	3,00,000	Captive Mines: Ostapal & Kalarangita Mines	By Road	100 km.
3.	Quartzite	2,400	19,200	21,600	Balasore & Mayurbhanj	By Road	72-75 km. & S.P. Enterprises Andhra Pradesh 1000Km
4.	Bauxite	2,400	4,800	7,200	Chhattisgarh & Jharkhand	By Road	180-220 km
5.	Hydrated Lime	9,450	0	9,450	Rajasthan & Katni(MP)	By Road	1000km
6.	Electrode paste	1,985	3,797	5,782	Norway &imported through Vizag Port	By Sea and Road	480 km
7	Molasses	22,680	0	22,680	Sakti Sugar Dhenkanal& Shree Jagannath Jatni	By Road	120-150 km
8	Pellet	0	7,00,000	7,00,000	From captive pellet plant	By Conveyor	-
9	Dolomite	0	21,600	21,600	Odisha, Chattisgarh & Jharkhand	By Road	400-600 km
II	**Pellet & Sinter Plant**						
7.	Chrome ore concentrate	-	7,00,000	7,00,000	Own Ostapal	By Road	100 km.
8.	Bentonite	-	3,500	3,500	External Agency	By Road	-
9.	Coke Dust	-	10,500	10,500	Neelanchal, Krishna Coke & Mother & Son Agency	By Road	25to 65 km

c) Basic Requirements of the project

Other basic requirements for the project are given in Table below.

Basic Requirements for the Project

S. No.	Particular	Existing	Additional	Total	Source
1.	Water Requirement (KLD)	1886	4365	6251	Ground water for existing plant Surface water for additional requirement
2.	Power Requirement (MW)	68	125	193	Power plant of the company and State Electricity Grid
3.	Manpower Requirement (No. of persons)				
(i)	Regular	237	150	387	Unskilled/Skilled/Semi-Skilled/HighlySkilled/ eligible & qualified local workmen.
(ii)	Contractual	1263	850	2113	
Total (i + ii)		1500	1000	2500	

4.0 PROCESS DESCRIPTION OF UNITS

Plant consists of following unit operation steps:

Existing units		Proposed units	
A	Briquetting Plant	D	Pellet & Sintering Plant
B	Ferro Alloys Plant	E	Ferro Alloys Plant
C	Metal recovery plant		

Existing Plant Units

A. Briquette Manufacturing Plant:

Briquetting is the process of converting chrome ore fines (i.e.– 6mm) fraction to a solid mass of desired size & shape with help of mechanical pressing using appropriate binders which are not harmful in open hearth submerged arc furnace operation.

B. Ferro Alloy Plant

Submerged Arc Furnace

The blended batch material including briquettes manufactured from briquetting plant stores on the bunkers placed above the furnace. As per the requirement the blended material descends through charging tubes into the furnace.

When enough energy is supplied, and material has been reduced to molten slag and metal and after opening the tap hole, metal and slag will flow out of the furnace to casting and granulation. Possible small gas eruptions or smoke emissions are captured by roof ventilation hood over the furnace off gas duct and sucked to the gas cleaning prior to blown into atmosphere.

Casting & Granulation

Submerged Arc furnace products are molten FeCr-metal and molten slag.After slag is removed to the skimmed slag pot, the crane moves the ladle to casting area. After some cooling time, the slabs are broken to disconnect them from each other and transported to product handling area by a front-end loader.

C. Metal Recovery Plant:

The Metal Recovery Plant of capacity 11,800 TPA is being used at present to recover metal from slag with the target of 10 %. Certain portion of slag around 40 % of total slag generation in the form of slag touched metal, metal touched slag and re-melt from HCFeCr process is conveyed to Metal Recovery Plant (MRP) wherein it is crushed as to extract good quality metal from the slag waste.

Proposed Units

D. Pellet& Sintering Plant

Grinding

Grinding balls for the ball mill are stored in barrels. Water is added to the ball mill in relation to raw material feed to get required slurry density (solid content).Slurry is pumped from the floor sump to the water treatment sump by a sump pump.

Filtering

The slurry mixing tank in the filtering area is located close to the ball mill and ceramic filters. The Filter pumps will be used to pump the filtrate water up to the header of the filters for continuous back-wash and/or for washing. Extra filtrate water is lead through a pressure control valve to the recycle water in the water treatment area.

Pelletising

In the proportioning area there are four filter cake bins for the filter cake coming from the ceramic filters. The filter cake is fed from all bins to collecting belt conveyor and the additives are proportioned to the collecting belt conveyor which feeds the material mixture to a mixer feed conveyor and to the pelletizing drum where undersize pellets drop through the gaps of the rollers to a primary recycle belt which takes also the undersize material from the roller feeder of the sintering furnace.

Sintering

Product green pellets are fed on the shuttle feeder, wide belt feeder and to the roller feeder respectively. The sintering furnace is a multi-compartment oven consisting of refractory lined hoods (compartments) for each process zone and refractory lined circulating ducts between the cooling and the front-end compartments. There are non-lined wind-boxes for each zone under the belt for extracting gas from the furnace in the front-end zones and for guiding cooling air to the pellet bed in the cooling zones. The drying zone and the last cooling zone are longer than the other zones in aim of an efficient drying and cooling.

Product Handling

Pellets from the sintering furnace are conveyed by the belt conveyors to one-deck vibrating screens. The screen undersize (-6 mm) flows to bin. The screened pellets (+6mm) flow to bins. Pellets are fed from the bins by vibrating feeders for filling of the bottom layer feed bin and for transporting product pellets to smelter area bins (normal operation) or to a pellet storage.

E. Ferro Alloy Plant

Preheating

After preheating kiln, the sections are continuing as charging and batches flow through and eventually to the Submerged Arc furnace through the furnace roof and combustion chamber with mixing chamber where all mixing of burned gas and recycled preheating kiln off-gas happens and the gas flows up and heats the descending feed material in the preheating kiln. Finally at the top of the preheating kiln the gas exists the preheating kiln through kiln off gas ducts&Venturi scrubber.

Submerged Arc Furnace

The preheated batch material descends from the charging tubes through openings in the furnace roof inside the furnace. When enough energy is supplied and enough batch material has been reduced to molten slag and metal and after opening the tap hole, metal and slag will flow out of the furnace to casting and granulation. Possible small gas eruptions or smoke emissions are captured by roof ventilation hood over the furnace off and blown to the atmosphere out of the roof ventilation stack.

Casting & Granulation

Submerged Arc furnace products are molten FeCr-metal and molten slag. After slag is removed to the skimmed slag pot, the crane moves the pure metal ladle to casting area. After some cooling time, the slabs are broken to disconnect them from each other and transported to product handling area by a front-end loader. And pure slag ladle transported by the EOT crane to granulation area and slag is being granulated.

5.0 CAPITAL COST OF THE PROJECT, ESTIMATED TIME OF COMPLETION

Total Cost of the Project	Rs. 1,221 Crores
Cost For Environment Management Plan	• Capital Cost: Rs. 92.25 Crores • Recurring Cost - Rs. 2.58 Crore/annum
Estimated Time of Completion	The entire project will be completed within 2 years from the date of obtaining Environment Clearance & Consent to establish.

6.0 SITE SELECTED FOR THE PROJECT-NATURE OF LAND

a) Nature of land

The existing plant area is 83.16 hectares (205.5 acres). Expansion will be done within the existing plant premises.

The study area of 10 km radius mainly comprises Agricultural land i.e.,83.14%. The second dominant land characteristics is of Settlement Area i.e., 9.25 %.Open Scrub/ Waste Land covers 0.28 %, Roads occupy 1.24 % of the total area. Railway line occupy 0.23 % of total area. These

comprises of 750.54 ha. i.e., 2.47 %, Industries occupy 0.15 % of the total land denoting the area still needs industrial growth. There are no Ecological Sensitive Areas (National Park, Wildlife Sanctuary, Biosphere Reserve etc.) within 10 km radius of the study area. Therefore, no forest land class was observed during classification. Roads occupy 1.24 % of the total area.

b) Status of its acquisition

The existing plant area is 83.16 hectares (205.5 acres). Expansion will be done within the existing plant premises. The total plant area is already under the possession of the company.

C) Nearby (in 2-3 km) water body, forest, eco-sensitive zones, accessibility

S. No.	PARTICULARS	DETAILS
1.	Nearest Town & City	Bhadrak city (~3.27 km in ESE direction)
2.	Nearest National/ State Highway	• SH- 53 (Adjacent) • NH-16 (~3.0 km in East direction) • SH- 35 (~3.0 km in SE direction) • SH-9 (~7.2 km in ESE direction)
3.	Nearest Railway station	• Baudpur Junction Railway Station (adjacent) • Kapali Railway station (~3.5 km in WSW direction) • Bhadrak Railway Station (~5.8 km in ENE direction)
4.	Nearest Airport	Biju Patnaik International Airport, Bhubaneswar (~115 km in SSW direction)
5.	National Parks, Wildlife Sanctuaries, Reserved Forests (RF)/ Protected Forests (PF), Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. within 10 km radius	No National Parks, Wildlife Sanctuaries, Biosphere Reserves, Tiger/ Elephant Reserves, Wildlife Corridors etc. lies within 10 km radius.
6.	Water Body (within 10 km radius)	• Akhuapada high level main distributary (~0.5 km in South) • Salandi Nadi (~0.5 km in NE direction) • Baudapur Distributary (~1.8 km in NE direction) • Kapali Nadi (~3.2 km in SSW direction) • Charampa Branch Canal (~5.5 km in North direction) • Kani Nadi (~6.5 km in SW direction) • Sarusagar Nadi (~7.0 km in WNW direction) • Nalia Nadi (~7.0 km in SE direction) • Reba Nadi (~9.0 km in SW direction)
7.	Interstate Boundary	• West Bengal State Boundary (~107 km in N/NE direction) • Jharkhand State Boundary (~114 km in N/NW direction)
8.	Seismic Zone	Seismic Zone – III [as per Vulnerability Atlas of India – 3rd Edition, BMTPC]

***Source**: Pre-feasibility Report*

d) List of major industries within 10 km radius study area

No major industry was found within 10 km radius study area

e) Greenbelt Development Plan

- Existing greenbelt has been developed in 28.99 Ha area which is about 34.84 % of the total project area of 83.16 ha.
- Total 43,605 numbers of trees were planted in the allocated land with a density of 1504 trees per hectare. To increase the density of the greenbelt, the remaining no. of trees will be planted inside the plant premises@2500 trees per hectare with consultation with DFO.
- The greenbelt & plantation development all around and inside the plant helps to attenuate the pollution level.
- Greenbelt is being/will be developed as per Central Pollution Control Board (CPCB) guidelines.

7.0 BASELINE ENVIRONMENTAL DATA-PRESENTATION OF RESULTS (AIR, NOISE, WATER & SOIL)

Baseline study of the study area was conducted during *Summer Season* (March to May, 2023).

Air: Ambient air quality was measured at 09 stations in the study area on 24 hourly basis. The observed values for $PM_{2.5}$ ranged between minimum- 20.9 µg/m^3 (Near Village NuaShashri) to maximum- 52.9 µg/m^3 (Town Bhadrak), PM_{10} ranged between minimum- 42.6 µg/m^3 (Near Village NuaShashri) to maximum-84.9 µg/m^3 (Town Bhadrak), The concentrations of SO_2 and NOx were found to be in range of 5.1 µg/m^3(Near Village NuaShashri) to 13.2 µg/m^3 (Town Bhadrak) and 9.9 µg/m^3 (Near Village NuaShashri) to 30.8 µg/m^3 (Town Bhadrak) respectively. CO concentration was observed in range BDL to0.87 µg/m^3.

Noise: Ambient noise levels were measured at 08 locations around the plant site. Noise levels vary from minimum-50.2 (Village Gobindapur) to maximum- 61.5 Leq dB(A) (Existing Plant Site) during day time and from minimum- 40.0 (Village Gobindapur) to maximum- 52.5 Leq dB(A) (Existing Plant Site) during night time.

Surface water: The surface water analysis for 04 sampling stations shows that pH varies 7.09 at Sarusagar Nadi to 7.19 at Reba Nadi and Kapali Nadi, Total hardness (60.02 mg/l to 95.04 mg/l), Total dissolved solids (125.0 mg/l to 190.0 mg/l), Alkalinity (54.0 mg/l to 82.0 mg/l) and conductivity (184.0 µS/cm to 272.0 µS/cm).

Groundwater: The ground water analysis for all the 08 sampling stations shows that pH varies 7.19 at Village Gobindpur & Near Villlage NuaShasari to 7.80 at Existing Plant site indicating slightly alkaline nature. Total hardness (180.14 to 296.58 mg/l); Total Dissolved Solids (302 to 510 mg/l). The concentration of chlorides varied from (70.42 to 116.81 mg/l); sulphates (12.88 to 51.34 mg/l); magnesium (12.11 to 16.28 mg/l) and fluoride (0.13 to 0.42 mg/l).

Soil: Soil monitoring was carried out at 8 locations and the analysis results show that pH ranged from 7.18 at Village Bhadrak to 7.87 at Village Narayanpur; as Organic matter (0.67 to 0.94 %)

were found low, potassium (354.39 to 660.44 kg/ha) was high, available nitrogen (250.33 to 496.04 kg/ha) was high and available phosphorus (18.9 to 32.65 kg/ha) was high. This indicates that soil fertility is medium. The Water holding capacity varies from 41.67% at Village Pathardiha to 52.11% at Village Gobindapur.

Traffic Study

Traffic survey has been conducted for 24 hours at SH-53 which is adjacent in North direction to the plant site. The LOS value is "C" after the project expansion which is "Good" for SH-53. Hence, the additional load on the carrying Capacity of the concern roads is not likely to have any change in the LOS value.

Biological Environment

Flora Diversity: Total of 34 trees, 21 shrubs, 31 herbs, 13 climbers and 09 species of grasses & Sedges have been recorded in the study area based on primary observation as well as based on information collected from the secondary data. As per the field survey and List of Flora by ENVIS, MoEFCC; no endemic, endangered and rare species of flora have been observed under threatened status in the study area.

Fauna Diversity: Among fauna, 2 species of amphibian, 4 species of mammals, 6 species of reptiles were recorded from the study area. Among 13 species avifauna were recorded in the study area.

No National Park, Sanctuary, Biosphere Reserve, Migratory Corridor of wild animals exists within 10 km radius study area.

Socio-Economic Environment

A detailed Socio-Economic report of 10 km radius area of the Plant Site has been carried out which comprises of 92 villages out of which 14 villages comes under 0-3 Km radius area, 36 villages come under 3-7 km radius area and 42 villages comes under 7-10 Km radius area. In the observed villages, number of scheduled caste (S.C.) population is (20.67%) and Schedule Tribe population is low (6.86%) in study area while (72.47%) of the population has been observed as others. The sex ratio in the study area is 973 females per 1000 males (as per Census 2011). The child sex ratio in study area is 959 females per 1000 male (as per census 2011). The 10 km radius study area demonstrates a literacy rate of 83.01% as per census data. The male literacy rate in the study area works out to be 89.25% whereas the female literacy rate, which is an important indicator for social change, is observed to be 76.61% in the study area as per the census data 2011. Field survey shows that on an average each household has 3 to 4 children of which boys are more than girls.

8.0 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Anticipated environmental impacts due to operation of the proposed project along with mitigation measures are given below:

Particulars	Impact	Mitigation Measures
Topography and land environment	Intensity of land use will increase which will increase the commercial production and in turn revenues in the area as well as company. Besides, no adverse impact on the surrounding land is anticipated.	➢ The solid wastes management plan will be discussed separately under 'Impact due to solid wastes", where it is proposed how solid wastes dumping can be avoided. ➢ Existing greenbelt has been developed in 28.99 Ha area which is about 34.84 % of the total project area of 83.16 ha. Total 43,605 numbers of trees were planted in the allocated land with a density of 1504 trees per hectare. To increase the density of the greenbelt, the remaining no. of trees will be planted inside the plant premises @2500 trees per hectare. ➢ All raw materials to be stockpiled on concreted areas with impervious flooring to avoid leaching and Stockyard will have garland drains.
Air Environment	The impact on air quality due emissions of PM, SO_2, NO_x from the various process stacks of the plant. The same has also been assessed for 9 sampling locations in nearby villages within 10 km study areas which ranges from 20.9 to 52.9 µg/m^3 for PM_{10}, 42.6 to 84.9µg/$m^3$for $PM_{2.5}$, 5.1to 13.2µg/$m^3$for SO_2 , 9.9to 30.8 µg/m^3 for NOx& BDL-0.87 µg/m^3 .	➢ In Ferro Alloy Plant, The bag filter is/will be used to suck the dusty air from feed conveyor dropping points and kiln feed bins. ➢ In Pellet & Sintering plant, Gases are sucked from the front-end compartments by separate off-gas fans to a common stack. The off-gases are cleaned in cascade type wet scrubbers. ➢ The raw material handling section is being/will be provided with dust suppression (DS) by water sprinkling at open stockyard & Good housekeeping practices are maintained.
Noise & Traffic Density	During operation, the noise will be generated mainly from Fan, Pump, Compressor etc. within the plant. The equipment shall be designed to comply with the stipulated limit of 85 dB (A). Traffic survey has been conducted for 24 hours at SH-53. The LOS value for existing road traffic is"Good" and the additional load on the carrying Capacity is not likely to have any change in the LOS value. Thus, it can be concluded that the present road network is good enough to bear the increased traffic load. Increase in traffic density may lead to increased fugitive emissions.	➢ Persons working just close to machine and machine operators are being/will be provided with personal protective equipment viz. ear plugs/ ear muffs etc. ➢ D.G. sets are being /will be provided with acoustic enclosures to control the noise level within the prescribed limit. ➢ Greenbelt of appropriate width at the plant boundary is being developed and same will be maintained. ➢ Sound absorbing material is provided in rooms where both the noise source and plant personal is present so that the reflecting sound is absorbed. ➢ It is also proposed to ensure that vehicles moving within the study area shall meet the latest Emission Standards applicable in the region. Speed Limit/ Bumper will be imposed to regulate vehicle speed. Truck/tippers shall be parked in designated parking area only, proper parking arrangements will be provided.
Water Environment	The requirement of water will be for process and sourced from ground water/surface water. The effluents, cooling water generated during the process, if not treated properly and	➢ Company is/ will be completely based on Zero Effluent Discharge. Waste water generated from proposed plant and others will be 100% utilized inside the plant premises. ➢ Treated water after primary treatment is being/ will be used in greenbelt & dust suppression.

	discharged carelessly on ground, soil or water bodies can enter into ground water through leaching.	➢ Proper storm water drainage network exists and being/will be treated in SRTP (Surface Run off water Treatment Plant). Capacity to be removed. ➢ Waste water generated from the domestic activities like from canteen, Toilet, Rest room & canteen being / will be treated in WTP/STP. Capacity to be removed. ➢ Rain Water Harvesting System is available. Maximum use of harvested water being / will be for plant use.
Solid & Hazardous waste management	Soil contamination can occur due to improper disposal activities of construction debris.	➢ APC dust form ferro alloy plant collected from various APCEs is being/ will be reused in Pellet Sinter Plant. ➢ FeCr Slag generated from the metal recovery plant is used for filling low lying areas. ➢ APC dust from pellet sinter plant will be reused in pellet sinter plant. ➢ Sewage sludge generated from STP will be used as manure in greenbelt development/ plantation. ➢ Sludge from WTP will be used in landfill. ➢ Used/ Spent oil will be sold to OSPCB Authorised vendor.
Land Use	During operational activity, changes in soil texture due to settling of air borne dust or due to wash off of solid particulates by surface or ground water. This will lead to change in porosity, permeability &other such physical characteristics of soil of the area.	Top soil would be used for greenbelt strengthening within the plant and its periphery, which would help in restricting the impacts due to the construction activities by creating a physical barrier. Besides, soil samples are being/ will be collected and tested at regular intervals from the nearby areas. This helps in mitigation of any harmful impact on soil due to the operational activity, if any. No solid or liquid discharge will be disposed off in soil.
Ecology	Potential impact on ecology due to any pollution related to air, noise, release of untreated effluent, improper solid and hazardous waste storage.	Existing greenbelt has been developed in 28.99 Ha area which is about 34.84 % of the total project area of 83.16 ha. Total 43,605 numbers of trees were planted in the allocated land with a density of 1504 trees per hectare. To increase the density of the greenbelt, the remaining no. of trees will be planted inside the plant premises @2500 trees per hectare. The greenbelt & plantation development in and all around the plant site help to attenuate the pollution level. Greenbelt will be developed as per Central Pollution Control Board (CPCB) guidelines.
Socio-economics	For the proposal, there will be no displacement of people from the villages which has been detailed in Chapter III.	The company has already taken various steps for social & environmental development in the areas like renovations & donations in school, health check-ups & camps; construction of roads, donation of blankets, etc. expansion project will increase the employment potential.

9.0 IDENTIFICATION OF HAZARDS IN HANDLING, PROCESSING AND STORAGE OF HAZARDOUS MATERIAL AND SAFETY SYSTEM PROVIDED TO MITIGATE

Type of Hazard	Source	Risk related to Hazard	Mitigation measures
Heat	Ferro alloy plant, Sinter-Pellet Plant	Burn/ Heat stress	Use of helmet, heat resistant clothing, heat resistant gloves, Use of Goggles by the workers. Workers are advised to work at a distance of 4 m from the molten metals. Rotation of workers on shift basis.
Dust and Gaseous emission	Sinter-Pellet Plant , Raw material and product storage yard, Transportation of raw material.	Pulmonary disease	Use of Nose Mask, Water sprinkling arrangement at requisite places, Provision of Bag filters, wet scrubber and dust extraction system as required. Stack monitoring and work zone monitoring to ensure the gaseous emission and dust emission within the prescribed standard.
Electrical	Furnace, Motors, Panels; Electrically operated equipment	Electrical shock and burn	Electrical area to be separated and access given to authorized personnel. Insulated cover provided in the electrical area. Proper earthing has been provided.
Explosion	Hot Product, Contaminated scrap handling	Burn, Injury	Combustible and flammable material to be separated from the hot product area.
Accident related to fall of machinery	Moving machinery, on-site transport, forklifts and cranes	Injury	Safety check of operation of equipment at regular intervals. Properly trained workers appointed to operate machineries, Workers working with cranes will be provided with all PPEs with safety belts.
Storage & Handling of HSD	Leak, Spill, Fire explosion, Toxicity	Injury, Burn	PPEs provided to the personnel working in the area. Fire extinguishers are provided.
Noise & Vibration	Furnace operation, melting process, fuel burners, raw material and product handling, rotating equipment, furnace charging.	Hearing loss / Fatigue	Noise monitoring, Audiometric examination of workers, Workers provided with PPE like ear plug, muff isolation, substitution and engineering control installation of acoustical hood, rotation of workers and minimize the time enclose fans, insulate ventilation pipes, cover and storage.

10.0 EMERGENCY PREPAREDNESS PLAN IN CASE OF NATURAL OR IN PLANT EMERGENCIES

The important elements considered in this plan are;

- Listing of anticipated Emergencies/locations
- Consequence Estimation for each type of emergency
- Deciding upon emergency organization & emergency actions
- Roles, Responsibilities & Communications during Emergency
- Alarm, communication procedures & Emergency Facilities in Plant, Emergency Control Centre
- Assembly, Rescue points, Medical Facilities, Training, Rehearsal & Evaluation

11.0 ISSUES RAISED DURING PUBLIC HEARING (IF APPLICABLE) AND RESPONSE GIVEN

Public hearing for the expansion project is yet to be conducted.

12.0 CER PLAN WITH PROPOSED EXPENDITURE

As per OM dated 30thSeptember, 2020 and 20th Oct., 2020, company will propose a detailed action plan along with budgetary allocation after conduction of Public Hearing considering based on issues raised during public hearing. The allocated funds will be spent for various socio-economic development activities proposed to be undertaken in the study area with a priority to villages falling in the impact zone, which may be further extended to other villages depending requirement.

13.0 OCCUPATIONAL HEALTH MEASURES

Regular medical check-ups and provision of safety gear, including Personal Protective Equipment (PPE), for workers during construction and operations. Safety Department personnel will conduct pre-shift safety briefings at each site to ensure occupational health. The following Safety measures will be undertaken to ensure good occupational health of workers:

S. No.	Occupational hazard	Measures
1.	**Dust**	▪ Implementation of adequate dust control systems and good housekeeping. ▪ Water sprinkling & regular sweeping in the places where dust dispersion can occur within plant premises ▪ Providing dust masks to employees working in handling and storage yards. ▪ Periodic work zone monitoring
2.	**Noise**	▪ Proper oiling & maintenance of machineries ▪ Installation of compressors and turbine in closed buildings ▪ Regular monitoring of noise level ▪ Display of noise level with permission level ▪ Display instruction to use of PPEs at high noise level area ▪ Periodic health checkup is being/will be kept as audiometric records for the persons working in high noise area.
3.	**Heat stress**	▪ Schedule hot jobs for the cooler part of the day ▪ Monitor workers who are at risk of heat stress ▪ Provide rest periods with water breaks ▪ Use of personal protective equipment
4.	**Electrical Hazards**	▪ Low Voltage Supply will be ensured ▪ Isolating Transformers ▪ Double Insulated Tools ▪ Over Load Protection ▪ Protection Against Leakages ▪ Flame- Proof Equipment ▪ Lightning Protection

5.	**Fireand Explosion**	▪ Suitable fire extinguisher, fire hydrant system and fire buckets are kept near transformer, cable, general store and office area. ▪ Oil and Flammable Gases storage area fenced and declared as Fire Hazardous Area- "No Smoking Area". ▪ Predictive interlock in transformers to give alarm and trip the system.
6.	**Other Hazards**	▪ Installation of light arrestors at all tall buildings ▪ Permit to work at height with work instruction to use safety belts etc. ▪ Testing of all lifting tools, tackles and vessel ▪ Safe working pressure is maintained in air receiver ▪ Safe working load for cranes and ropes etc. ▪ Good housekeeping & Speed limit of 20 km/hr in plant area ▪ Display of emergency number at all suitable location ▪ Ambulance and emergency staff ready at the plant main gate at all the time ▪ First aid kits are kept at the sites and training provided ▪ Use of mobile while driving, alcohol, smoking etc. are banned in plant area ▪ Proper illumination in office, plant area and road area

14.0 POST PROJECT MONITORING PLAN

S. No.	Aspect	Monitoring parameters	Location	Schedule and frequency of monitoring	Responsibility
CONSTRUCTION PHASE					
1.	Ambient Air Quality Monitoring	PM_{10}, $PM_{2.5}$, SO_2, NO_2	Work Zone- Construction site	Manual work-zone ambient air quality monitoring will be conducted near the construction site of the plant area. - By FACOR in-house environment team- Quarterly. - By NABL Accredited Laboratory-Half Yearly	FACOR/NABL Accredited Laboratory
2.	Noise Level Monitoring	-	Work zone- construction site	Manual noise-level monitoring at construction site. - By FACOR in-house environment team- Monthly. - By NABL Accredited Laboratory-Half Yearly	FACOR /NABL Accredited Laboratory
3.	Drinking water monitoring	As per IS: 10500-2012	Construction site	One location near construction site. By NABL Accredited Laboratory- Six Monthly	NABL Accredited Laboratory
OPERATIONAL PHASE					
4.	Meteorological data	Dry bulb temp, wet bulb temp, relative humidity, wind speed, wind direction and rainfall	Permanent station in plant premises. The wind sensor is preferably at 10 m height above the ground without any surrounding hindrances that may affect the free flow of wind	1 No. Online Meteorological station will be installed with CAAQMS	FACOR
5.	Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, Ozone, Lead, Ammonia, Benzene, BaP, Arsenic and Nickel (As per NAAQS 2009)	Plant premises and in nearby villages	1 No. Online continuous ambient air quality monitoring station is available and datas being sent to the SPCB/CPCB server.. (PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO). Manual monitoring at 04 locations outside the plant area within 05 kms radius of plant boundary to be conducted by MoEFCC recognized/NABL	FACOR /NABL accredited lab

				accredited third party laboratory-Six monthly.	
6.	Stack Emission Monitoring	PM, SO_2, NO_X	At all major combustion-based stacks.	1 no online continuous monitoring system is available and an additional monitoring system will be installed for the proposed unit as per CPCB directions. In absence of online system, manual monitoring as per CTO condition.	Online continuous monitoring system/ NABL accredited lab
7.	Performance Evaluation of pollution control equipment		All pollution control devices	Yearly	FACOR
8.	Fugitive Emission		Locations across Raw Material Handling area, storage area, near control rooms, workshop, yards, junction houses, etc.	Six Monthly for every location	NABL accredited lab
9.	Noise Level Monitoring		Seven locations around the plant boundary and at five other locations in 05 kms radius of the plant boundary	Once every three months for each location by FACOR in-house Environment monitoring team. Once every six months for each location by NABL accredited laboratory.	FACOR /NABL accredited lab
10.	Water Quality/effluents	Water quality of surface and ground as per IS: 10500-2012 except radioactivity	**Ground water-** 4 locations in 4 kms radius of the plant boundary **Surface water-** As per availability	Six monthly	NABL accredited lab
		Effluent- pH, TSS, TDS, BOD, COD	ETP/STP - Outlet	ETP/STP-effluent quality monitoring by own lab (pH, COD & TSS- Daily basis TDS & BOD – Weekly). Online effluent monitoring system as per CPCB guideline will be installed.	FACOR
11.	Soil quality for fertility	N, P, K, organic matter, water holding capacity, density, texture, etc.	One location inside the plant area	Yearly	NABL accredited lab

12.	Inventory of hazardous waste	Within plant	Yearly or as directed by SPCB	FACOR
13.	Medical check-up of employees	Nearby hospitals/ Health Centre/On-site Occupational health Centre	Yearly	FACOR
14.	Water Consumption	At all consumption points through water meter	Continuous through water meter	FACOR
15.	Environmental & Energy audit	Plant site	At regular interval	FACOR

15.0 ENVIRONMENT MANAGEMENT CELL

An Environmental Management Cell (EMC) is envisaged which is responsible for monitoring EMP and its implementation. EMC/ EHS members meet periodically to assess the progress and analyze the data collected during the month.

Responsibilities of EMC

The responsibilities of the EMC include the following:

- Procurement and commissioning of Pollution Control/Monitoring Equipment.
- Timely Calibration of pollution control equipment and facilities.
- Environmental monitoring of the surrounding area.
- Ensuring that standards are maintained and efficiency of the pollution control measures.
- Ensuring optimum water usage.
- Specification and regulation of maintenance schedules for pollution control equipment.
- Development & Maintenance of the greenbelt & plantation.
- Proper implementation of the Environmental Management Plan.
- Organizing meetings of the Environmental Management Committee and preparation of report and submission of such reports to management.
- Co-ordination for all statutory requirements like submission of application/reports for obtaining Consents, Environmental Clearances, authorization and compliance reports to statutory authorities etc.
- Developing & implementing occupational health & safety policy, program and procedure & increasing health & safety awareness at all levels within the organization.
- Reporting of compliances and non–compliances (if any) to management and other stakeholders.
- Informing Board of Directors about Non- Compliances.

16.0 CONCLUSION

It is concluded to say that the proposed expansion project is an environmentally friendly project, there will be no significant impact on the area, as adequate pollution control measures and preventive measures are being/will be adopted to maintain the various pollutants within the permissible limits. Regular monitoring of all the components of environment is being/will be done. Increased social welfare measures are being/will be taken by the company that will bring development in the near-by villages. Development and maintenance of Greenbelt around the area has been/will be also taken up as an effective pollution mitigation technique, as well as to control the pollutants released from the plant premises.

Therefore, proposed expansion of the ferro alloys plant consisting of Pellet & sinter plant will not degrade the environmental quality of surrounding environment. It would contribute towards the improvement of the socio-economic conditions and aesthetics of the surrounding areas.