EXECUTIVE SUMMARY

for

EXPANSION OF FERRO ALLOYS PRODUCTION UNIT (UNIT-I)

at

Plot No. 567/B, 568, 553/B, Urla Industrial Area,
District- Raipur, Chhattisgarh- 492003

(Schedule 3(a)-Category A)

PROJECT PROPONENT

HIRA FERRO ALLOYS

M/s Hira Ferro Alloys Limited (HFAL)

Plot No. 567/B, 568, 553/B, Urla Industrial Area,
District- Raipur, Chhattisgarh- 492003

ENVIRONMENTAL CONSULTANT

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1.1. PROJECT DESCRIPTION

M/s Hira Ferro Alloys Limited (HFAL) is a certified ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007 company of Hira Group which is one of the leading business conglomerates in the state of Chhattisgarh. The group is one of the largest groups of Chhattisgarh with predominant interest in power generation, sponge iron, steel making, steel rolled products, ferro alloys and coal and iron ore mining and cement manufacture. The group has vast experience in Ferro Alloys & Steel making projects among other products.

HFAL has an operational ferro alloy manufacturing unit located at Plot No. 567/B, 568, 553/B, Urla Industrial Area, District-Raipur, Chhattisgarh. The industry currently manufactures Ferro Alloys (Silico Manganese/Ferro Manganese) having a total capacity of 10,500 TPA. Since the unit was established prior to EIA Notification 2006, the existing plant doesn't come under purview of earlier environmental clearance. The unit is operational as per the latest Consent to Operate issued by SPCB (CECB) vide Letter No. 4249/TS/CECB/2024 dated 16.08.2024 (valid up to 31.07.2025). The total plant area is 9851.30 (0.98513 Ha.). The unit has one Submerged Arc Furnace (SAF) having capacity of 5 MVA.

The site is self-sufficient with all the infrastructural facilities consisting of utilities, environment management, manufacturing area, OHC, full-fledged safety department, warehousing, and site technical management.

Now, the company has proposed for **"Expansion of Existing Ferro Alloy Plant"** by modification of existing 5 MVA SAF to 11 MVA and production of Ferro alloys by **"Forward integration using high-grade Mn ore and other raw material"**. It has also proposed to manufacture Fe-Si (Ferrosilicon) and Pig Iron in the existing plant under proposed expansion.

Table 1: Details of Production Capacity

Particular	Existing	After Expansion
Furnace Configuration		
SAF	1 x 5 MVA	1 x 11 MVA
Production Capacity		
Si-Mn	10,500 TPA	18,000 TPA or
Fe-Mn		29,000 TPA or
Fe-Si	-	9,000 TPA or
Pig Iron	-	30,000 TPA

The planned augmentation in production capacity will be achieved primarily through debottlenecking, change in the raw material and modification of 5 MVA SAF to 11 MVA SAF. Previously, Ferro Alloys were produced using domestically sourced Manganese (Mn) Ores, which were primarily silicate in composition. The recovery of Mn from silicate Mn Ores was comparatively lower, ranging from approximately 65-70%. However, the transition to imported Mn Ore characterized by an oxide nature, initiated an exothermic reaction within

the furnace. This exothermic reaction has proven instrumental in augmenting Mn recovery within the furnace, resulting in a notable increase to approximately 80%.

Concomitant with this enhanced recovery, the carbon consumption rate in the furnace has diminished from 340 kg per ton to approximately 310 kg per ton of metal. Furthermore, due to the utilization of a higher-grade Mn ore and the resulting exothermic reaction, there has been a concurrent reduction in specific slag production per ton of finished product. This improvement is also associated with a reduction in specific power consumption per ton of finished product.

The transition from domestic Manganese (Mn) to imported Mn and the shift from 65 FC (Fixed Carbon) coal to 80 FC coal will yield the following enhancements in production capacity through debottlenecking measures:

- **Increased Smelting Rate**: Utilization of high-grade Mn Ore, characterized by its dioxide composition and minimal gangue content, will result in an augmented smelting rate.
- **Enhanced Production on an Hourly Basis**: The incorporation of high-grade coke will lead to an elevated smelting rate, consequently increasing production on a per-hour basis.
- **Pre-Reduction of Ore**: The utilization of dioxide ore initiates a pre-reduction process directly atop the furnace. This process augments the overall reduction rate within the furnace.

The revised capacity of SAF (From 5 to 11 MVA) and above-mentioned changes will be able to produce **18,000 TPA Si-Mn or 29,000 TPA Fe-Mn or 9,000 TPA Fe-Si or 30,000 TPA Pig Iron.**

As per the Government of India (Ministry of Environment, Forests & Climate Change (MoEF&CC), EIA Notification 2006 and further amendments, the proposed expansion of ferro alloys manufacturing unit is required to obtain prior environmental clearance. The proposed project is covered under **Schedule 3(a), Category 'A'** as per the Schedule-I of EIA Notification 2006 and its amendments thereof.

Consolidated Details of Project have been given below in **Table 2:**

Table 2: Consolidated Details of Project (Total after Expansion)

S. No.	Particulars	Unit	Existing	Additional	After Expansion	Remarks
1.	Total Project Cost	Rs. (In Cr)	9.89	18	27.89	Increase
2.	Total Plot Area	Ha	0.985130 (2.434 Acre)			No change
3.	Green Area	Sqm	5271.62 (Inside: 1225.62 + Outside at	0	5271.62 (Inside: 1225.62 + Outside at boundary wall of	Increase in density of plants

S. No.	Particulars	Unit	Existing	Additional	After Expansion	Remarks
			boundary wall of factory: 2758)		factory: 2758)	
4.	Workers/Staff	No.	57	18	75	Increase
5.	Fresh Water Requirement	KLD	40	40	80	Increase
6.	Wastewater Generation (Including Domestic Sewage & Industrial Effluent)	KLD	9	6	15	Increase
7.	Recycled Water	KLD	5	5	10	Increase
8.	Power Requirement	MW	4	4	8	Increase
9.	Capacity of Furnaces	MVA	1 x 5	Modification of 5 to 11	1 x 11	Increase

1.2. DESCRIPTION OF THE ENVIRONMENT

1. *Site Characteristics*

The project site is located at Plot No. 567/B, 568, 553/B, Urla Industrial Area, District-Raipur, Chhattisgarh. The coordinates of the center of site are Latitude: 21°18'48.74"N & Longitude: 81°36'50.42"E. Land use and land cover of the site is Industrial. The existing unit is spread over an area of 9851.30 (0.98513 Ha.). The proposed expansion is planned within the existing premises only.

The site is easily accessible via road and rail networks. The nearest road from the project is NH-30 located 1.6 km towards west direction. NH-30 is further connected to the Birgaon Main Road. Other highways and roads from the project are NH-53 located 7.8 km towards SW & NH-130B at 7.4 km towards SE direction. The nearest railway station from the project is Urkura Railway Station located 4.1 km towards SE direction. The nearest airport from the project is Raipur Airport located about 19 km away from site towards SE direction. Project being located near the Industrial area, many small to large scale industries are present in the area

2. *Topography and Meteorology*

Topography of District: Physiographically the area in Raipur district having plains belonging to Chhattisgarh basinal area with an elevation of 278 feet (298.16 meters) amsl and the general slop is towards the north-east.

Topography of Project Site: The terrain is plain.

3. *Climate and Meteorology*

Temperature–The mean daily minimum temperature of 16°C (January) while mean daily maximum temperature of 41° C (May).

Relative Humidity–During the monsoon season highest relative humidity was observed to be 75%.

Rainfall–The total annual rainfall is 1801.3 mm. The maximum total monthly rainfall is 567.95 mm which occurred in July and minimum monthly rainfall during monsoon is 0 mm which occurred in February.

4. *Seismicity*

According to the seismic-zoning map of India, the project area falls in Zone-II (Low Risk Zone) of seismicity.

5. *Soil*

The monitoring was carried out at eight locations in the study area. The soil texture is Sandy Loam.The soil pH ranges were observed from 7.11 to 7.64 during study season, thereby indicating the soil ranges from "Neutral to Slightly Alkaline".The Organic Carbon content of sampled soil during study varied from 0.34% to 1.51%, thereby implying that soils range from "Low to Medium" in organic carbon content.Available nitrogen content in the surface soils ranges between 110.6 kg/ha to 154.1 kg/ha thereby indicating that soils are "Low" in available nitrogen content. Available phosphorus content ranges between 32.1 kg/ha to 43.2 kg/ha thereby indicating that soils vary from "High" in available phosphorus.Available potassium content in these soils' ranges between 145.6 kg/ha to 179.2 kg/ha thereby indicating that the soils are Medium in potassium content.Overall fertility of the soils in study area ranges from Low to High Fertility.

6. *Water*

The ground water and surface water monitoring were carried out at eight locations each in the study area.

Surface Water: The pH values of all analyzed samples ranged between 6.84 to 8.2. The TDS levels were observed to be 195 – 540 mg/l. Total hardness levels were observed to be ranging from 98-178 mg/l. Dissolved Oxygen were observed between 3.2 mg/l to 7.2 mg/l. Chloride levels were observed between 18-66 mg/l. Total Coliform levels were observed from 3220 to 5620 mg/l. Comparing the values of pH, DO, BOD and Total Coliforms with 'Use based classification of surface waters' published by Central Pollution Control Board; the analyzed river and canal surface waters are classified as "Class 'B" and can be used for Outdoor bathing (Organized) and Class "C" that will be used for Drinking water source after conventional treatment and disinfection.

Ground Water: The analysis results indicate that the pH ranged between 7.1 to 7.62, which is well within the specified standard of 6.5 to 8.5 limit. Total hardness was recorded to range from 185 to 435 mg/l, which is within the permissible limit 600 mg/l at all locations. Total Dissolved Solids (TDS) concentration recorded ranged between 326 to 793 mg/l and was within the permissible limits (2000 mg/l) at all locations. Chlorides was recorded in the range from 56.8 to 166.9 mg/l, which is within the permissible limit 1000 mg/l at all

locations. Sulphates at all the locations were within the permissible limits (400 mg/l) as it ranged between 14.8 to 101.4 mg/l. Bacteriological studies reveal that no coliform bacteria present in the samples. The heavy metal contents were observed to be below detectable limits. All physical and general parameters were observed within the permissible limit as per IS10500:2012 (Second Revision).

7. Air Quality

Nine locations were monitored for air sampling within the study area. The monitoring results of ambient air quality were compared with the National Ambient Air Quality Standards (NAAQS) prescribed by MoEF; GoI Notification dated 16.11.2009. The maximum concentration of PM10, PM2.5, SO2 & NOx was 115 µg/m3, 65 µg/m3, 14.6 µg/m3 & 36.3 µg/m3 respectively.

8. Noise

The noise levels at day time ranges from 51.2 to 63.4 dB(A) wherein, the maximum noise levels at daytime were observed at Cross-section of Urla Road &Birgaon Main Road and the minimum noise levels were recorded at Tendua. The noise levels at night time ranges from 42.2 to 60.3 dB(A) wherein maximum noise levels at night time were observed to be at Urla Residential Complex while minimum levels were observed at at Raipur. At all locations, the noise level is within the prescribed National Ambient Noise Quality Standards prescribed.

9. Biological Environment

10 Km radius study areas was assessed via physical survey and secondary study sources. There were approx. 46 types of trees, 23 types of shrubs, 16 types of herbs & several type sof epiphytes, climbers, grasses and bamboos. For fauna, 3 types of mammals, 1 type of amphibian, 1 type of reptile & 11 type of birds have been observed in the core zone. In study area, 10 types of mammals, 1 types of amphibians, 6 types of reptiles have been observed. 53 types of bird species were also observed in the study area. No Schedule-I species were observed.

10. Demography

As per Census of India 2011, the total population of the study area is 194864 in which 101295 (51.98%) are males and 93569 (48.02%) are females. An average gender ratio of the study area is 924, which shows that there is almost equality among the composition of male and female. 16.27% of the population belongs to 0-6 age group. An average gender ratio of the 0-6 age group of the study area is 962 females' children per 1000 male children. The entire population of the study area has been grouped into 41102 households and the average size of the household is approx. 4.74 people/ household. an average literacy rate of the study area is 65.19% out of which male literacy is 72.35% with respect to the male population and female literacy is 57.44% with respect to the female population, creating a gender gap of 14.91%. In respect to the core and buffer zone an average literacy rate is 66.59% and 63.83% & creating a gender gap of 13.77% and 15.95% respectively.

1.3. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Air Quality: The plant is maintaining all emission norms prescribed by

MoEF&CC/SPCB/CPCB. Regular monitoring of emissions is done via third party laboratory to keep in check with the emissions. Online Continuous Emission Monitoring system (OCEMS) has already been installed to Submerged Arc furnace and connected to CPCB server. Also, Continuous Ambient Air Quality Monitoring Station (CAAQMS) is installed and connected to CECB Server. No additional stack is proposed under expansion. Cumulative and continuous emissions from existing and proposed industries in an area may increase the pollutant level in the air. Increased pollutant levels may cause respiratory problems or carcinogenic diseases to the workers and other people in the area. Thus, use of efficient mitigation measures and air pollution control system is required. As part of the proposed expansion, it is proposed to augment the bag filter system by incorporating an addition of extra bags. Air to cloth ratio in gas clean plant for stack emissions control will be kept from 1.5 to 1.1 and all bags will be replaced with Polyester Needle Felt High Density with Anti Adhesive Treatment. Furthermore, it is proposed to integrate new water sprinklers into the raw material handling system, ground hopper, and conveyors to further enhance dust control measures. Hence, plant will not impact the ambient air quality within the site and surroundings in a negative extent.

Noise: Noise may cause speech interference, annoyance, hearing impairment, increase in heartbeat/ blood pressure of the human. The plant has various machines which generates noise. These machines are already inbuilt with appropriate control measures to maintain the noise levels within limits. The equipment's are provided with Acoustic pad insulation / Acoustic enclosures to limit the noise level as per the standard. Noise level at Boundary Fence is controlled by providing green belt throughout the boundary wall of plant. The noise level at the boundary of the existing plant is 63.4 dB(A) during daytime and 58.9 dB(A) during nighttime. The noise level at all monitored locations is within the prescribed limited. The noise generated from the project activities will not be escalated significantly due to atmospheric attenuation. Thus, no major impact is anticipated due to the proposed addition of machineries. The equipment's are already designed with enclosures and mufflers which ultimately reduce the noise level around the machinery.

Water Quality: The freshwater consumption of the existing unit is 40 KLD which is primarily used for cooling, domestic and horticulture purposes. After expansion, the freshwater requirement will increase by additional 40 KLD only for cooling tower as well as domestic purpose. The total freshwater requirement on the full potential of plant will be 80 KLD. Water is being sourced through Ground water and CSIDC (Chhattisgarh State Industrial Development Corporation) supply. The wastewater generation from the existing plant is 9 KLD (Industrial: 5 KLD and Domestic: 4 KLD). After expansion, the domestic wastewater generation will increase to 5 KLD and industrial wastewater generation from Cooling tower blowdown will increase to 10 KLD. The total wastewater generation will be 15 KLD. Industrial effluent of 10 KLD is being collected in two separate RCC tanks made for collection and treatment of waters in which the suspended solids got settled in tank-I through gravity and this water is collected in tank - II. The water is further processed through charging of lime and bleaching for balancing of PH. For COD and BOD balancing in the tank, air pipes are separately arranged and blown up in regular intervals. After completion of all the process the treated water is supplied through pumps where all the

water is pumped and reused in the plant. Domestic wastewater is being disposed through septic tanks followed by soak pits. Plant will be Zero liquid discharge project. Thus, there is no direct impact on water quality.

Waste: There are generation of slags from manufacturing process and bag filter dust from APCS. This slag is a hard mass and usable for road embankment applications. The slag generated from the furnaces contains 3% of saleable metal (ferro alloys). The entrapped metal is recovered from the slag in the Metal Recovery Plant (MRP). Toxic Chemical Leachability Potential (TCLP) test is regularly done by unit to check the metal concentrations in the slag.

Soil Quality: Spillage of material like effluent, used oil and fuel may contaminate the soil. Due to improper disposal of solid waste & liquid waste includes the leaching and effect on flora from spillage of waste on soil. Improper disposal of effluent during shutdown may encounter soil and contamination. However, the unit does not discharge neither liquid effluent nor solid waste directly into the soil. Soil quality of project site as well as nearby places with Low to High fertility status validate the same. Toxic Chemical Leachability Potential (TCLP) test is regularly done by unit to check the metal concentrations in the slag. The unit abides by various protection measures that avoid soil pollution.

Ecology & Biodiversity: The impact on the surrounding ecology during the operation of the project will mainly occur from the deposition of air pollutants, discharge of untreated wastewater and sold waste generated from the proposed expansion project. Air pollution affects the biotic and abiotic components of the ecosystem individually and synergistically with other pollutants. Chronic and acute effects on plants and animals may be induced when the concentration of air pollutants exceeds threshold limits. The incremental emission of air pollutants will not likely to induce any significant changes in the ecology because the national ambient air quality standards will remain within the limits. Approx. 1225.62 sqm i.e., 12.4% of the area has been developed as green area within the premises. Moreover, an additional 2758 sqm i.e., 28% of green area has been developed outside the premises at boundary wall of factory. Hence 40% of plantation has been already developed at the boundary wall of the factory.

Socio-economic Environment: The proposed project will affect positively the welfare of local people through direct and indirect employment opportunities as employees will be hired from nearby city & towns, which will improve the Socio-economic environment of the area. The project will be beneficial to nearby people. Through CER activity company management is committed to improve infrastructural facilities for the local people. Due to operation & maintenance there may be various risks for the staff and other nearby people. The risks associated are accident of people, collapse of structures, fall/slip while working, electrical shocks, electrical fire, fire in DG sets & fuel tanks, health impact due to air & noise pollution etc. Various safety measures are to be followed which should be taken to prevent the accidents and near miss. At the extent all possible measures are already adopted by the HFAL to reduce impact on staff and nearby area. Further, same will be strengthen during expansion.

Conclusion: From above analysis, it is found that the impacts anticipated vary from Medium to low significance and magnitude. No impact is anticipated during the preconstruction and constriction phase as limited installation/construction is proposed. However, during operation phase, impact is anticipated due to increased polluted air quality. The project also has various positive impacts like indirect employment generation, increase in the indigenous production and ease of the availability of proposed product. It is believed that the anticipated negative impacts can be normalized by taking the proposed mitigation measures. Proper environment and social management plans are to be prepared for ensuring implementation of the proposed mitigation measures.

1.4. ENVIRONMENTAL MONITORING PROGRAMME

Environmental monitoring plan will be implemented as per regulatory requirement to comply the necessary compliances. As per the MoEF&CC guideline, Environment monitoring report and compliance of conditions mentioned in the environment clearance will be submitted to the IRO-MoEF&CC, SPCB, MoEF&CC online portal i.e., PARIVESH and shall be uploaded on company's website. Compliances will be submitted in month of June and December for the period of October to March and April to September respectively. Third party laboratory (approved MoEF&CC and NABL laboratory) shall be appointed for carrying out the monitoring. Also, self-environmental audit, Health & safety audit and Energy audit shall be conducted annually.

1.5. ADDITIONAL STUDIES

Site has onsite emergency plan in place. All the measures are adopted in plant to avoid risk or fight with any kind of disaster. Employees are trained regarding their specific role in case of emergency. The emergency response topic is incorporated as a part of safety training program. If any person/worker who gets affected during Emergency incidence in factory will immediately provide First aid and then taken to company's Doctor/Hospital where he will be treated as per the instruction of doctor or shall be shifted to better medical centre. The company has kept a vehicle in the factory to meet any emergency if arise during operations. Further a qualified Doctor has been deputed whose clinic is near the industrial Area and his services are available round the clock. Production Manager, Shift In-charge, Supervisors are well aware of emergencies, they are living /staying in nearby area and are able to reach site at any moment. Company has appointed a doctor and trained person are employed to give the FirstAid/ Medical assistance to the victim at site and to carry him for the further treatment (if requiredand refer by doctor/First Aid person) to Hospital/ Medical Center inside/off side the Factory.

1.6. PROJECT BENEFITS

The company is adopting many technologies and innovations to improve the production and achieving Environmental sustainability. Its greater efficiencies allow to produce the highest quality at a competitive price while minimizing footprint on the environment. 3R method shall be adopted in the plant. The proposed project will be a Zero liquid discharge

project. Wide green belt is provided all around the boundary wall of project site. The industry has put in serious effort to create greenery and the number of trees, plants, shrubs and herbs has increased considerably. In the past few years, the industry has contributed approx. INR 2.87 Crores for CSR and in the latest financial year, approx. INR 30.39 Lakhs has been planned. It is proposed to spend Rs. 0.25 Crores of project cost on CER activities. Through CER activity company management will be committed to improve infrastructural facilities for the local people in the field of Environmental and Medical. Operation of the proposed project will contribute significantly to the revenue of the state and central governments in the form of different types of taxes including GST and earning of foreign currency due to export.

1.7. ENVIRONMENT MANAGEMENT PLAN

HFAL has created a team consisting of officers to co-ordinate the activities concerned with management and implementation of environmental control measures. This team undertakes the activity of monitoring stack emissions, ambient air quality, noise level etc. either departmentally or by appointing external agencies assistance wherever necessary. Regular monitoring of environmental parameters is being carried out to find out any deterioration in environmental quality and also to take corrective steps are taken, if required, through respective departments.The Environmental Management Cell also collects data about health of workers, green belt development etc., EMC is headed by Executive Director of the company which reports to the Board of Directors.

The cost for the proposed expansion is Rs 18 Crores. Construction and installation of machinery will be completed in 3 months. In proposed expansion, it is proposed to invest 3.81 crores and 38.14 Lakhs/A towards capital and maintenance cost, respectively.