

SUMMARY ENVIRONMENT IMPACT ASSESSMENT REPORT

Proposed Integrated Steel Plant

Villages Dagori, Ameri Akberi & Udgaon, Tehsil Bilha

District Bilaspur (Chhattisgarh)

by

JAYASWAL NECO INDUSTRIES LIMITED

RAIPUR , CHHATTISGARH

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CONTENTS

1.0	Project Description	Page 3
2.0	Description of Environment	Page 7
3.0	Environmental Impact & Mitigation Measures	Page 9
4.0	Environmental Monitoring Program	Page 14
5.0	Additional Studies	Page 15
6.0	Project Benefits	Page 16
7.0	Environmental Management Plan	Page 16

1.0 Project Description

Jayaswal Neco Industries Ltd. (JNIL) is one of the reputed manufacturers of iron and steel and foundry products in the country. JNIL is operating a large Integrated Steel Plant near Raipur and captive coal mines near Tamnar in Chhattisgarh.

Jayaswal Neco Industries Limited proposes to establish a Greenfield integrated steel plant near Dagori, Ameri Akberi and Udgaon villages, tehsil Bilha, District Bilaspur, Chhattisgarh. The proposal includes iron and steel making through the blast furnace and sponge iron route, steel making using the electric arc furnace route, steel rolling, sinter plant, coke oven, oxygen plant and captive power plant. The activity falls under Category A Serial 3 (a) of EIA Notification 2006. The Terms of Reference for the EIA study was approved by the Ministry of Environment & Forests, Government of India (MOEF) vide letter No. J.11011/302/ 2011/ IA-I (I) dated 16th August 2011. The draft EIA report has been prepared for public hearing as per the TOR prescribed by MOEF.

Project Description: The name and capacity of the proposed units and the products are given below:

	Name of the Unit	Capacity, MTPA	Products
1.	Iron ore Benefication and Pellet Plant	1.2 MTPA	Iron ore pellets
2.	Blast Furnace	0.4 MTPA	Hot metal/ Pig iron
3.	DRI Plant	0.6 MTPA	Sponge iron
4.	Coke Oven (non-recovery type)	0.2 MTPA	Metallurgical Coke
5.	Sinter Plant	0.4 MTPA	Sinter
6	Steel Melting Shop	0.7 MTPA	Steel
7.	Rolling Mill	0.65 MTPA	Steel Products
8.	Oxygen Plant	400 TPD	Oxygen
9	Captive Power Plant	100 MW	Electricity

1.2 Project Cost: The estimated cost of project is Rs.3800 crores.

1.3 The plant will directly employ 2000 persons (500 Engineers, 900 skilled workers and 600 semiskilled workers). About 2000 persons will get employment in various contractual works. About 1500 people will get job for 36 months during the construction of the plant.

1.4 Land Requirement: 210.8 hectares land has been identified to establish the project. 1.68 ha land (4.17 acres) shall be required for the railway line from Dagori station to site (0.55 acre railway land and 3.62 acres private land). About 2 ha land (5 acres) shall be required to lay the water pipeline from Shivnath river anicut (proposed at Ghoghara village) to site. Only single crop agriculture land shall be acquired. No displacement of human settlement is involved. No forest land is involved. The details of 210.8 ha land proposed to be taken from three villages is shown below

	Name of village	Patwari Halka No.	Area in Hectares
1	Ameri Akbari	20	75.214
2	Udgaon	20	52.6
3	Dagori	21	82.96

1.5 Water Requirement: 825 kl/hour (19800 kl/day) water will be required for the project. Water will be taken from Shivnath River and transported to site by pipelines. State Investment Promotion Board has recommended the application of JNIL to State Water Resource Department, Chhattisgarh Government.

1.6 Raw Materials: Raw Materials and finished products will be transported by rail. Railway siding shall be developed inside plant by taking a rail line from Dagori railway station. Coal will be transported from captive mines at Gare Block, Raigarh through road. Limestone, dolomite, etc available in Bilaspur and neighboring district shall be transported through road.

Description of Raw Materials, Source & Transportation

	Name	Quantity, TPA	Source & Transportation to Site
1	Iron ore fines	1806,800	Metalbodli and Chota Dongar mines, by rail

2	Iron ore lump	972,000	As above
3	Coal	906,000	Gare Pelma mines, Raigarh, By road
4	Middlings	50,000	As above
5	Coking coal	280000	Imported from South Africa/Indonesia, by rail
6	Dolomite	47280	Purchased from Bilha / Hirmi, by road
7	Limestone	116,000	Purchased from Baloda Bazar, by road
8	Calcined Lime	28510	Purchased from Katni, by rail
9	Calcined dolime	39798	Purchased from Katni, by rail
10	Ferroalloys	28005	Purchased from Open Market, by road
11	Bentonite	10000	Purchased from Open Market, by road

Brief Manufacturing Process

Iron ore Beneficiation and Pellet Plant: Iron ore fines are grinded to liberate the alumina and silica and then washed using water to beneficiate the ore. Iron concentrate and tailings are formed. The concentrate is mixed with grinded limestone, coke fines and benonite along with water. The nodules formed are taken to indurating furnace. The nodules are converted to pellets.

Sponge Iron Plant: Crushed raw materials (Iron ore, coal & dolomite) are fed to the kiln. Coal provides the source of heat and also acts as reducing material to turn iron ore into iron. Sponge iron produced is separated from waste materials in magnetic separator, screened and sent to steel making shop.

Blast Furnace: It is a vertical furnace. Sinter, iron ore, coke and limestone are charged from furnace top that slowly travels down and comes in contact with upcoming hot air. Coke reduces iron ore to iron and also supplies heat. Iron ore gets converted to iron and impurities are converted to slag, which is taken out at regular intervals. Blast furnace gas will be reused as fuel in the blast furnace stoves. The molten iron is converted to pigs or directly taken to steel melting shop.

Steel Melting Shop: Pig iron, sponge iron, lime and ferroalloy is charged from the top of Electric Arc Furnace. Arcing melt the contents. Oxygen blowing is done. Steel is tapped and chemistry correction is done in Laddle Refining Furnace. Liquid steel is casted into billets in continuous casting machine. Slag is taken out from slag tap hole.

Rolling Mill: Steel billet is rolled into different products in the Rolling Mill. Mixed blast furnace gas and coke oven gas will be used as fuel in the reheating furnace.

Sinter Plant: Sintering process utilizes iron from waste materials that would otherwise be dumped as wastes. Iron ore fines and dust containing iron, mill scales, limestone, coke and coal fines are mixed, converted to nodules and sintered in sintering furnace.

Coke Oven: Coke is formed by pyrolysis of coal (heating in absence of oxygen). Coal is compacted to form cake, which is put inside series of ovens with the help of pusher machine. The hot gases heat up the cake in the sealed oven. Volatile matter present in the coal are burnt and used for steam generation using WHRB. The solid carbon remaining in the oven is taken to quenching tower, where it is cooled with water spray. The coke is screened and sent to blast furnace.

Air Separation Plant; Air separation shall be done cryogenically. Nitrogen, oxygen and argon from air shall be separated. Oxygen is used in SMS and Blast Furnace.

Power Plant: In power plant high pressure steam is produced using pressurized boilers, which are fed to turbines for generating electricity. Coal, middlings and dolochar shall be used as fuel in the AFBC/CFBC boiler. DRI Kiln gas shall be used in WHRB. The steam produced shall be fed common steam header. 3 x 25 MW turbines shall be used to generate 75 MW power. Blast furnace gas shall be used to generate 13 MW electricity through gas fired turbines. Coke oven gas shall be used to generate 12 MW electricity through WHRB.

2.0 Description of the Environment

Baseline environmental data generation of study area was carried out during the period 1st October 2011 to 31st December 2011. Data was generated by following the standard procedure of the Ministry of Environment & Forests and the Central Pollution Control Board. Study area of 10 km radial distance around the site has been considered for environmental baseline data generation.

Location: Mumbai-Howrah railway line passes from the east side of the plant. Bilaspur city is located on the north side of the plant, about 28 km away. Bilha is located about 5 km away in north direction. The nearest railway station is Dagori, about 500 m away from plant boundary. Approach to plant shall be taken from Raipur – Bilaspur Highway, passing about 6 west of the site. Shivnath river is located 3.5 km south side of the plant site. Maniari river is located about 3 km from the site in west direction. Devrani Jethani temple of cultural and historical importance is located on the left bank of Maniari river at Tala village. Ruins of an ancient temple of archaeological importance has been discovered and conserved since 1986 by the CG Govt. Maniari river joins Shivnath river near Tala village. No national parks, biosphere reserves, wildlife sanctuary, health resorts and defense installations are present within 10 km radius of the site. Only one steel industry is present close to the site (Nova Steel Plant about 3.5 km south of the proposed site)

Meteorology: Met station has been established at JNIL office, in Bilha. Historic met data was collected from India Meteorological Department. The predominant wind direction is from north sector during all season. The average wind speed ranges from 1.0 to 2.2 m/s. Daily mean temperature varied from 13.0°C (January) to 42.7°C (May). The relative humidity varied from 19% (April) to 88% (August). The annual rainfall is 1354 mm.

Air Quality: The PM_{2.5}, PM₁₀, SO₂ and NO₂ levels (Criteria Pollutants) were monitored at eight locations in the study area. The observed mean levels are as follows; PM_{2.5} : 19 to 35 µg/m³, PM₁₀: 42 to 60 µg/m³, SO₂: 5.0 to 8.6 µg/m³ and NO₂: 9.0 to 16.4 µg/m³. The baseline air quality levels are within the National Ambient Air Quality Standards prescribed for residential and industrial area (NAAQS 60, 100, 80 and 80 µg/m³ for PM_{2.5}, PM₁₀, SO₂ and NO₂ respectively). Other pollutants are found to be below the detectable limit.

Noise Quality: Ambient noise levels were monitored at 8 locations in the study area. The observed Leq levels in residential area for day time (6 AM to 9 PM) range from 46.5 to 51.2 dB (A) and night time (10 PM to 6 AM) range from 38.5 to 42.5 dB (A). The baseline noise levels are well within the National Standards for residential area (Standards are 55 dBA-day time and 45 dBA-night time).

Water Quality: Eight surface water samples and eight groundwater samples were collected from the study area for chemical and biological analysis. The surface water quality and groundwater quality of the study area are satisfactory. The groundwater quality is fit for potable use. No metallic or bacterial contamination was found in the water quality.

Soil Quality: Five soil samples were collected from the study area and analyzed. The texture of soil is sandy loam to clayey loam. The organic matter, nitrogen, potassium and phosphorus content of the soil are found to be in moderate amount. The pH and conductivity of all the soil samples are well within the acceptable range.

Ecology Quality: No reserve or protected forest is present in the study area. Tree species found in the study area are neem, seesam, bargad, papal, sal, mahua, beeja, tendu, saja, semal, babul, haldu, siris, dhaura, palas, gulmohar, nilgiri, gular, mango, karanj, etc. Fox, mongoose, porcupine, jungle cat, langur, monkey, cobra, krait, rat

snake, chameleon, and variety of birds are the common wildlife of the study area. No endangered species of plants and animals are found in the study area.

Sensitive Ecosystem: Within 10 km distance of the project site, no plant or animal species were found to be on the endangered list. No ecologically sensitive area like biosphere reserve, tiger reserve, elephant reserve, migratory corridors of wild elephant, wetland, national park and wildlife sanctuary are present within 10 km distance of the project site.

Socioeconomic Data: The total population of Bilha tehsil is 102675 (2001 census). The literacy rate of is 70%. Agriculture work dominates the occupation structure of the study area. Paddy and chana are the main crop grown in the area. Only one steel industry (Nova Steel) is present in the study area.

3.0 Anticipated Environmental Impact & Mitigation Measures

Air Quality: The major pollutants from the project will be dust, SO₂ and NO_x Particulate Matter emissions will be controlled using Electrostatic Precipitators, Scrubbers and Bag Filters. The outlet emission will be restricted within 50 mg/Nm³. Particulate Matter emissions from SMS will be controlled using Fume Extraction System connected to Bag Filters and the outlet emission will be restricted within 50 mg/Nm³. Particulate Matter emissions from Blast Furnace will be controlled using dust catcher followed by two stage wet venturi scrubber and the outlet emission will be restricted within 10 mg/Nm³. Unit wise stack emission load and other details are given below:

Stack Emission Inventory from the Proposed Project

	Name of Unit	Stack height (m)	Stack top dia, m	Stack temp, (K)	Stack velocity (m/s)	Stack Emission Rate (g/s)		
						PM	SO ₂	NO _x
1	DRI Dedusting stack1	30	1.0	303	10	0.4	--	--
2	DRI Dedusting stack2	30	1.0	303	10	0.4	--	--
3	DRI Dedusting stack3	30	1.0	303	10	0.4	--	--

4	DRI Kiln stack1	80	2.5	413	10	1.8 7.1		91
5	DRI Kiln stack2	80	2.5	413	10	1.8 7.1		91
6	Sinter Dedusting Stack	30	2.0	303	10	1.5		
7	Sinter machine stack1	60	1.5	413	10	0.6	0.6	10.9
8	Pellet Dedusting Stack	30	2.0	303	10	1.5	--	--
9	Pellet Plant Stack	60	3.5	413	10	3.7	--	13.9
10	Coke oven Stack 1	70	3.5	413	10	5.2	13.2	26.0
11	Coke oven Stack 2	70	3.5	413	10	5.2	13.2	26.0
12	Blast Furnace Stack1	55	1.8	413	10	0.9	1.82	0.9
13	BF Stock House	30	2.5	303	15	3.6	--	--
14	Stack attached to SMS	50	3.5	413	10	3.47	--	6.97
15	SMS dedusting stack	30	2.5	303	10	2.4	--	--
16	Rolling Mill stack	86	2.6	413	10	0.4	--	3.8
17	Power Plant Stack (BF gas based)	50	3.5	413	8	0.6	--	11.1
18	FBC Power Plant Stack	80	2.5	413	15	5.2	53.2	41.6

Water spraying will be done to suppress the dust generated during construction activity. All internal roads of the plant will be made concrete. All roads and shop floors will be cleaned regularly. Fugitive dust from all sources like stock house, day bins, material handling, crushing, screening, etc will be controlled using plant dedusting systems comprising suction, ducting and bag filters.

Mathematical modeling study proved that the maximum incremental ground level concentration of PM, SO₂ and NO_x from the plant will not violate the residential and industrial ambient air quality standard. The maximum impact of the air emissions will be observed between 1.5 to 2.5 km from site in south direction. The ambient air quality will remain well within the prescribed standard hence it will not create any adverse impact on human health and ecology.

Impact of Air Quality & Percent Contribution by the Project (24-h avg in µg/m³)

Parameter	Incremental MGLC	Baseline Value (max)	Superimposed value	National Standard*	% contribution by the project (max)
SO ₂	22.4	8.6	31.0	80	28%
NO _x	12.4	16.4	28.8	80	15.5%
PM ₁₀	7.2	60	67.2	100	7.2%
PM _{2.5}	7.2	35	42.2	60	12.0%

Noise Quality: Unloading and hauling operations and movement of trucks and dumpers will be properly scheduled to minimize construction noise. The air compressors, rotating machines, pumps, ID fans, air blast, blowers, mill operations, turbines, will be the major sources of noise. All activities will be carried out inside sheds and maintenance program for equipment will be routinely followed. Sound absorbing materials will be provided in the room where both the source and receiver are present so that the reflecting sound is absorbed. 33% land shall be developed as greenbelt, which will further reduce the noise level. In noisy work areas soundproof duty rooms will be provided. Workers working in noisy areas will be given ear plugs. In this manner the noise level will be restricted within the plant boundary to meet the industrial area standards of 75 dBA during day time and 70 dBA during night time.

Water Quality: Rainwater harvesting structures will be constructed as per guidelines of Central Ground Water Board. Rooftop rainwater will be diverted towards these structures for recharging the groundwater. Surplus runoff will be collected and stored in the water reservoir. Sedimentation pits with oil separator will be constructed to trap the silt-laden water arising from site offices, canteens and other washing facilities at the construction site. The overflow will be reused for dust suppression. Scrubbed water from blast furnace gas cleaning plant will be taken to thickener and reused for dust scrubbing. Cooling tower blow down water generated during the plant operation will be reused for slag granulation and dust suppression. Domestic wastewater will be treated in Sewage Treatment Plant and reused for gardening. No wastewater will be discharged outside the plant premises (under normal operating conditions). The storm water drain will be kept separate from wastewater drains. The storm water drain will have sedimentation pits and oil-water interceptors, before discharging into nalla. During rainfall the treated wastewater shall be discharged onto nearby nalla. Spent oil and lubricants will be collected in drums and given to authorized recyclers. The quantity of water required for various units, unit-wise wastewater generation and scheme to achieve complete recycling is shown below:

Water Balance and Wastewater Management Scheme

	Name of the Unit	Water Consumption KI/hour	Wastewater Generation KI/hour	Management Scheme
1	Beneficiation and Pellet Plant	25	Nil	Closed water circuit maintained. After passing through thickener, the water will be recycled for ore washing
2	Blast Furnace	100	Nil	Closed water circuit maintained. After treatment in ETP, the water will be recycled for dust scrubbing in wet scrubber
3	DRI Plant	140	28	Cooling tower blowdown shall be recycled for slag granulation (100%)
4	Coke Oven	20	Nil	Quenching water shall be recirculated
5	Sinter Plant	10	Nil	100% evaporation loss during mixing of raw materials and its heating
6	Steel Melting Shop	90	18	Cooling tower blowdown shall be recycled for slag granulation (100%)
7	Rolling Mill	130	26	Wastewater shall be taken to scale pit, where oil and scales are skimmed off and the water is then recycled for roll cooling
8	Oxygen Plant	40	8	Cooling tower blowdown shall be recycled for slag granulation (100%)
9	Captive Power Plant	260	52	The wastewater from all units shall be taken to Guard Pond. After treatment the water shall be used for ash handling and dust suppression
10	Domestic	10	8	Taken to Sewage Treatment Plant for treatment. The treated water shall be used for gardening purpose
	Total	825	140	No wastewater shall be discharge outside the plant premises (under normal operating conditions). Entire wastewater shall be treated and reused inside the plant. The scheme is not applicable during rainfall events.

Solid Wastes: The solid wastes like slag will be granulated and sold for cement making. SMS slag will be reused for road making. Sinter plant dust will be recycled. DRI plant char will be mixed with coal fines and middlings and reused for power generation. Ore fines, dust from air pollution control devices and mill scales will be reused in sinter plant. Unutilized solid wastes shall be stored in dump yard.. The solid waste utilization and management scheme is shown below:

	Name of Solid Wastes	Quantity, TPA	Utilization
1	Blast Furnace Slag	120,000	Sold to cement plant (100%)
2	Blast Furnace Dust & Sludge	14,400	Reused in sinter plant (100%)
3	DRI Plant Dust	120,000	Reused in sinter plant (50%), balance in filling abandoned limestone, quartzite and dolomite mines
4	DRI Plant Dolochar	115,000	Reused in power plant (100%)
5	Ore Beneficiation Tailings	300,000	Filling abandoned limestone, quartzite and dolomite mines
6	Power Plant Ash	90,000	Making flyash bricks, blocks (20%), Given to Cement Plant Balance in filling abandoned limestone, quartzite & dolomite mines.
7	SMS Bag Filter Dust	7050	Reused in sinter plant (100%)
8	SMS Slag	128160	Metal recovery and then used for filling abandoned limestone and dolomite mines
9	Mill Scales	14035	Reused in sinter plant (100%)

Soil Quality: The soil quality of the site and surroundings is sandy loam to clay loam. The infiltration rate of the soil is moderate. Air pollution control devices will be installed at all points to trap the dust. Solid wastes generated from the air pollution control devices and process will be reused. Unutilized solid wastes shall be stored in dump yard with stable floor and also scientifically designed landfills.

Ecology: Dust emission from the plant will be controlled using scrubber, ESP and bag filters. Flue Gas will be dispersed using tall stacks. All air emissions will be kept within the prescribed standards. Wastewater and solid waste will be reused in the plant. Greenery development will be developed. 33% open spaces will be made green. Such measures will be adequate to protect the surrounding ecology.

Public Health: The national ambient air quality standards prescribe level of air pollutants that will protect public health and vegetation. Air quality dispersion modeling study proved that the ambient air quality of the area will remain within the national air quality standards. Wastewater and solid wastes generated from the plant will be utilized. No toxic chemicals or hazardous wastes will be handled in the plant. Hence there will be no risk to public health.

Landform: No building materials will be extracted from the project site. Excavated earth will be used for leveling and backfilling of civil foundations. It will be ensured that drains and garland drains are constructed conforming to the existing drainage pattern so that alteration is kept to the minimum and flooding does not occur.

Greenery Development: Site clearing is not required. While planning the layout it has been ensured that the existing trees are retained. 33% land shall be developed as greenbelt. About 181500 trees, shrubs and herbs shall be planted on 72.6 ha land area.

Impact on Road Transportation: Raw materials and finished products shall be transported by rail using the railway siding located inside plant. Some raw materials and finished product shall be also transported using road. Daily expected movement is 85 dumpers and 20 trailers. The existing road capacity and condition is inadequate to bear the additional traffic load. Hence the road will be strengthened in consultation with the local administration and panchayat samitis.

4.0 Environmental Monitoring Plan

Environmental Management Department (EMD): Full-fledged EMD shall be created. EMD shall be placed under the direct control of Chief Executive of the plant. Separate full fledged environmental laboratory shall be created. Qualified and experienced Scientists and Engineers shall be recruited in the EMD.

Activities of EMD: EMD will perform the following activities:

1. Regular monitoring of stack emissions, fugitive emissions work environment and report any abnormalities for immediate corrective measures.
2. Regular monitoring of ambient air quality at plant boundary and outside the plant in upwind and downwind direction.
3. Regular monitoring of re-circulating water quality, ground water quality and surface water quality.
4. Regular noise monitoring of the work zone, equipments and outside the plant.
5. Green belt plantation, maintenance, development of other forms of greenery like lawns, nursery, gardens, etc. in the plant premises.
6. Regular monitoring of quantity and quality of solid waste and their reuse options.
7. Development of schemes for water conservation, rain water harvesting and reuse of treated wastewater.

5.0 Additional Studies

Risk Mitigation Measures: Necessary risk mitigation measures, including firefighting measures will be implemented. Hazards due to mechanical injury will be reduced by use of standard design and operating procedures. Oil tanks will be located and designed as per the guidelines of Oil Industry Safety Directorate. All necessary safety measures shall be provided. Disaster Management Plan shall be implemented in consultation with the District Administration to take care of health and safety during any untoward incident.

Rehabilitation: Rehabilitation of project affected persons will be done as per the Policy of Chhattisgarh Government. Financial compensation as per Chattisgarh Government rate shall be paid to land losers. Preference will be given to land losers for employment in the project (for operation as well as for construction of the plant). They will be recruited as per their skill and experience.

6.0 Project Benefits

Direct Benefits: The project will overcome the demand and supply gap of steel product in the country. The project will also generate additional revenue for the State Government. The additional steel availability will boost the infrastructure sector and the overall economic scenario of the country. The project will create direct employment for 1500 people during the construction phase of 36 months. About 4000 people will be directly employed in the plant (2000 direct by JNIL and 2000 for various contractual jobs). Local people will be preferred for employment during the construction and operation stage. About 1500 people are expected to get indirect employment from the project.

Community Development Spending Benefits: JNIL shall spend Rs.190 crores for various socio-economic and community development activities in surrounding villages. The activities cover education, health, infrastructure, culture and sports, skill development and training and women empowerment. JNIL shall earmarked Rs.4.75 crores as annual recurring expenses for CSR activities. Details are provided in section 5.2 of the EIA report.

7.0 Environmental Management Plan

Environment Management Department will implement the EMP of this project. All recommendations given in the EIA report including that of occupational health, risk mitigation and safety will be complied with. The capital cost required to implement the pollution control systems and EMP is Rs.255 crores. The annual recurring expenses will be Rs.36.5 crores. .

EMD will ensure that all air pollution control devices, effluent treatment plant and water re-circulating systems function effectively. Schemes for resource conservation (raw materials, water, etc), rainwater harvesting and social forestry development will

be taken up by EMD. Greenbelt and greenery development inside and outside the plant premises will be intensified by the EMD. Greenery on 33% land will be ensured. Guidelines issued by the Central Pollution Control Board (CPCB) on greenbelt development will be followed and district forest department will be consulted for selection of trees.

Environmental awareness programs for the employees will be conducted. EMD will also ensure cleanliness inside the plant. All records shall be submitted to the regulatory authorities, displayed at relevant places like company gate and website and maintained by the EMD.

