EXECUTIVE SUMMARY

For the Proposed Unit of

5000 tons/month Capacity Sponge Iron Unit

&

12 MW Power plant

by

KANNAPPAN IRON AND STEEL COMPANY (P) LTD- UNIT – II

(Sponge Iron and Power Division)

S.F.No: 19/1 (Pt), 19/8 (Pt) – Paruvaai Village,
40/1A1, 40/1B (Part), 42/1, 42/2, 42/3, 42/3, 42/4, 42/5, 42/6, 43/2, 43/3A, 43/3B and 43/4 - Karadivavi Village,
Karadivavi Village,
Palladam Taluk,
Tiruppur District

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1.0 PROJECT DESCRIPTION

1.1 Introduction

M/s. Kannappan Iron and Steel Company Pvt Ltd. –**Unit II** (Sponge Iron and Power) is a proposed unit to be located at S.F. Nos. 19/1 (Pt), 19/8 (Pt) – Paruvaai Village , 40/1A1, 40/1B (Part), 42/1, 42/2, 42/3, 42/3, 42/4, 42/5, 42/6, 43/2, 43/3A, 43/3B and 43/4 - Karadivavi Village, Palladam Taluk, Tiruppur District, which is located 15 km away from Tiruppur.

This unit proposed to produce 5000 T/M of sponge iron and power plant of 12 MW/M by using heat recover from sponge iron unit to fulfill the requirements in Tamil Nadu and other parts of India. The gross assets value of the expansion unit is about 150 Crores.

1.2 Plant Location

M/s. Kannappan Iron and Steel Company Pvt Ltd. is a proposed unit to be located at S.F. Nos. 19/1 (Pt), 19/8 (Pt) – Paruvaai Village , 40/1A1, 40/1B (Part), 42/1, 42/2, 42/3, 42/3, 42/4, 42/5, 42/6, 43/2, 43/3A, 43/3B and 43/4 - Karadivavi Village, Palladam Taluk, Tiruppur District, which is located 15 km away from Tiruppur. The gross assets value of the expansion unit is about Rs.150 crores.

1.3 Products Manufactured

S.No	Materials	Quantity
1.	Sponge Iron	5000 T/M
2.	Power generation	12 MW

1.4 Raw Materials

(a) Raw Material for the Power plant as follows:

S.No.	Raw Material	Quantity (T/M)
1.	Coal (50%)	3480
2.	Charcoal (50%)	1920

(b) Raw Material for the sponge iron plant as follows:

S.No.	Raw Material	Quantity (T/M)
1.	Iron ore	12000
2.	Coal	6000
3.	Dolomite	200

1.5 Manufacturing Process

1) 2X95 TPD SPONGE IRON PLANT (DRI)

Coal based DRI process

The coal-based method of producing sponge iron involves reducing iron ore (lumps/pellets) with a carbonaceous material like coal or lignite. The reduction process is carried out in a rotary kiln (which is inclined and rotates at a pre-determined range of speeds) at a stipulated temperature (850°C – 1050°C). The inclination & the rotary motion of the kiln ensure that the raw materials move from feed-end to the discharge-end of the kiln and it is during this movement that the actual reduction of iron ore to iron takes place. The material discharged from the kiln is taken to a rotary cooler for cooling and the cooled product, after being discharged from the cooler moves on to the next step in the production process viz. product separation and handling system.

At this stage the product is a mixture of sponge iron and non-magnetic matter such as char and with the aid of magnetic separators, the final product, sponge iron is separated and stored in bins meant for the purpose. The basic reactions for the process are as follows:

$3Fe_2O_3$	+	CO	>	$2Fe_3O_4$	+	CO_2
Fe_3O_4	+	CO	>	3FeO	+	CO_2
FeO	+	CO	>	Fe	+	CO_2

Sponge Iron and Its Specification

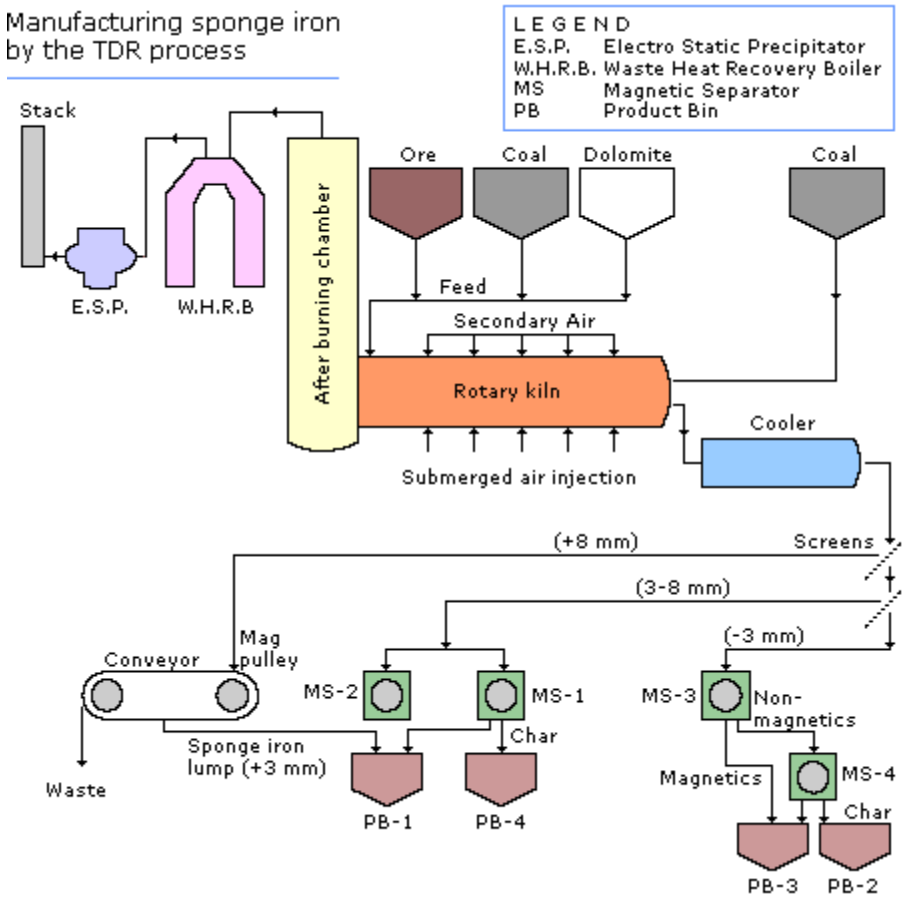
Constituent	Coal Based DRI
Chemical Composition	
Fe (Total)	
Fe (Metallic)	81-84%
Metallisation	90 (+/- 2)
Carbon	0.2 - 0.3 %
Sulphur	0.025 – 0.030 % max
Phosphorus	0.05 – 0.06 % max
Gangue	5.0 – 8.0 % max
Physical Composition	
Size	3 – 30 mm
Bulk Density	1.6 – 2.0 mt/m^3
Inherent Density	3.5 mt/ m^3
Nominal Weight	--
Nominal Size	--

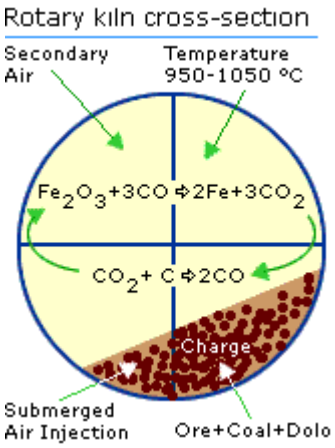
In light of the above comparative study between the two processes, one could obviously select coal based one and the decision could be justified. Hence, for the proposed sponge iron project, process selection is limited to

sponge iron production by Direct Reduction processes using non-coking coal as Reductant.

The Process Technology considered for adoption is the"MODIR"(Modified Direct Reduction Process) developed and commercialized by M/s.Industrial Projects and Service ". This Technology is similar to that of SL/RN Direct Reeduction Process developed by M/s.Lurgi, Germany. This process has been commercialized and absorbed by various Companies. The Production,productivityand quality is on par with any other Technology in world and hence it is selected.

PROCESS DIAGRAM

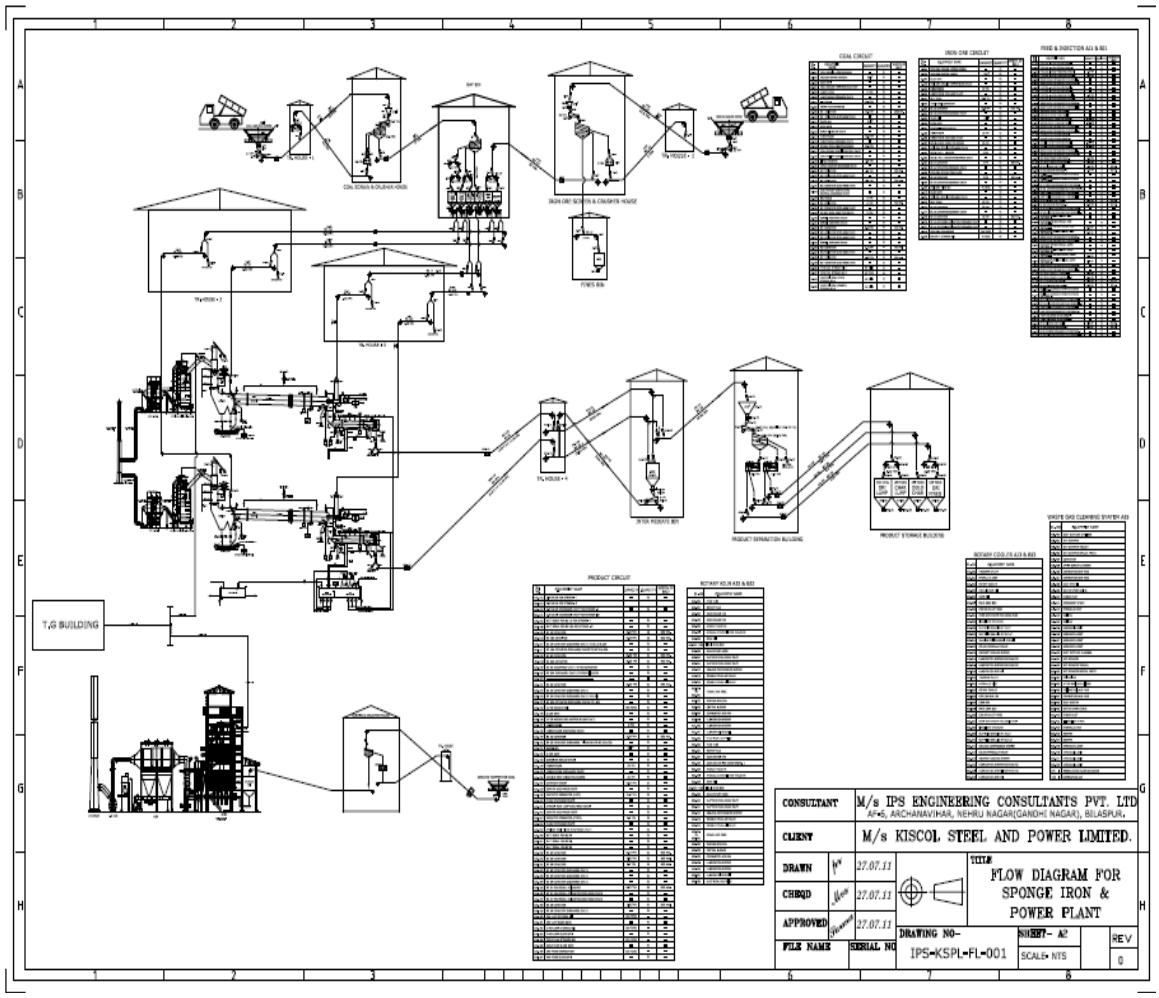




Iron ore (haematite) and non-coking coal are the prime raw materials for the production of sponge iron. These are charged into a rotary kiln in requisite proportion along with some dolomite. Coal plays a dual role in the process by acting as a reductant as well as a fuel for providing heat to maintain the requisite temperature inside the kiln at 950-1050C. The reduction process occurs in solid state. The crucial factor in this reduction process is the controlled combustion of coal and its conversion to carbon monoxide to remove oxygen from the iron ore. The overall process requires a duration of approximately eight to ten hours inside the kiln, during which iron ore is optimally reduced and discharged to a rotary cooler for cooling below 120°C., before coming out into the finished product circuit.

2) 12 MW CAPTIVE POWER PLANT USING WHRB & FBC

PROCESS FLOW CHART



- The proposed plant shall be configured with 2 nos of Waste Heat Recovery Boilers (WHRB) of capacity of 10 TPH each 67 kg/cm^2 and 485±5°C

- The balance steam for generating the rated power will be generated by one nos of Fluidized Bed Combustion Boiler (AFBC) using Coal and Char of capacity 36 TPH operating at 67 kg/cm^2 and 485±5°C.

- The proposed one no 12 MW Steam Turbine shall have one uncontrolled extraction connected to one constant pressure deaerator normally working at 125°C feed water temperature.

- The steam generated in the boilers would be sufficient to generate 12 MW of power.

- The feed water system of Boilers is sized to support the installed capacity of boilers to enable 12 MW power generation.

- One induced draft RCC counter flow Cooling Tower with three cells of adequate capacity to meet the design operating point of the proposed CPP is envisaged

- 1 x 5 m^3/hr rated flow capacity single stream fully manual operated outdoor type DM plant is envisaged for the proposed CPP.

- All electrical equipment will conform to relevant IS/IEC standards and recommendations of IEEE standards.

- One centralized Control System is envisaged for the operation of major equipment (Boiler, STG, CW System) in the plant and other auxiliary systems (Compressors and DM plant) shall be operated from their relay based local control panels/stations.

- The steam at required parameter to STG would be provided through a main steam header. All Boilers will be connected to this main steam header.

The variation in the steam generation of WHRB will vary in line with the variation in the hot gas parameters and its flow.

1.6 Power and Fuels

Power consumed for sponge iron unit will be approximately 1.3 MW and the captive power for power plant will be approximately 1.2 MW. Total power will be generated in the captive Power plant. During power failure, DG set will be used to initiate power plant.

1.7 Raw Water

The requirement of water for these units will be met from Pilur water scheme and Private water supply. The total consumption of water for the Sponge Iron and Power units will be 735 KLD.

1.8 Land

The total area allotted for both the unit is 29.31 acres.

1.9 Manpower

The total workforce including staff and workers for the power plant will be about 150. The total workforce including staff and workers for the sponge iron plant will be about 250.

1.10 Organization Structure

The Senior General Manager is responsible for the factory operations. There are several executives for various sections such as Production, Human Resource, Purchase, Store, Accounts, Environmental & Safety, Maintenance, and Quality Control etc.

2.0 ESCRIPTION OF THE ENVIRONMENT

2.1 Climate

The study area is situated in the warm climatic belt with moderate humidity. During the summer the temperature ranges from 29°C to 35.75°C while during winter it varies between 17.4°C to 26°C. The rainfall is mostly due to the NE and SW monsoon season with the average precipitation of 644.3 mm per year. The maximum rainfall is generally experienced in the months of August, September and October.

2.2 Ecology

There is no endangered species of flora and fauna noticed in this area. The area does not shelter any specific wildlife.

2.3 Hydrological Conditions

2.3.1 Surface Water

The run-off during monsoon period contributes to the surface water. These villages get water due to rain in rainy season.

2.3.2 Ground water

Since ground water drawn from hand pumps, open wells and water supply systems at selected towns are the main sources for domestic use,

2.4 Water Quality

Water samples were collected from different locations, and the following parameters will be monitored for pH, Colour (Visual), Odour, Turbidity (NTU), Electrical Conductivity, Total Suspended Solids, Total Dissolved Solids, Chlorides (as Cl), Sulphates (asSO_4), Calcium (as Ca), Magnesium (as Mg), Total Hardness(as $CaCO_3$), Phenolphthalein Alkalinity(as $CaCO_3$), Total Alkalinity (as $CaCO_3$), Iron (as Fe).

2.5 Ambient Air Quality and Noise Levels

The ambient air quality was studied for various locations. It is found that the Particulate Matter (PM_{10} and $PM_{2.5}$) is found to vary from 19 to 59 µg/cu.m and 14 to 35 µg/cu.m respectively. During the present study SO_2 concentration is from 7 to 18 µg/cu.m. Oxides of Nitrogen (NOx) range from 13 to 31 µg/cu.m. The noise levels recorded at various locations indicate that it is mostly less than 55 dB (A).

2.6 Land Use Pattern

This Site is classified as unclassified area recognized by the Tamilnadu Government.

Anticipated Environmental Impacts and Mitigation Measures

2.1 Air Emissions and Control Measures (Sponge Iron & Power Unit)

Sl. No.	Source of Emission	PC Measures Provided	Stack Details	
			Diameter in (mm)	Ht from GL. (m)
1	Iron Ore Crusher /Screen House	Bag Filter with ID Fan	550	30
2	Goal Crusher /Screen House	Bag Filter with ID Fan	550	30
3	Stock House	Bag Filter with ID Fan	650	30
4	Coal Injection Bldg.	Bag Filter with ID Fan	200	30
5	After Burning Chamber	E.S.P. – 2 Nos. Chimney- 1 No	TOD-1800: BOD-3050	60
6	Cooler Discharge Bldg.	Bag Filter with ID Fan	650	30
7	Intermediate Bin	Bag Filter with ID Fan	650	30
8	Product Separation / Storage House	Bag Filter with ID Fan	650	30
9	DG Set 750 kva-1No.	Stack	250	15
10	FBC Boiler	ESP – 1No. Chimney- 1 No	TOD-1400 BOD-2300	60
11	Coal/Char preparation& handling Plant	Bag Filter with ID Fan	550	30

3.2 Wastewater Generation and Method of Treatment

Sponge Iron & Power Plant:

S. No.	Particulars	Water quantity m^3/day	Method of Treatment
1.	Wet scrapper below DSC	1.0	To ETP proposed inside the Unit premises
2.	Cooling Tower Blow down	46.0	To ETP proposed inside the Unit premises
3.	Boiler Blow Down	4.0	To ETP proposed inside the Unit premises
4.	R.O. Rejection	74.0	Gardening, Road Sprinkling and Dust suppression
5.	Sewage	27.0	To Common STP of 50 KLD proposed in the Unit premises
	TOTAL	**152**	

2.2 Solid Waste generation and method of disposal

Sl.No.	Location	Nature of Waste	Total Quantity per Day	Disposal Method
1	Below Dust Settling Chamber / Wet Scrapper	Sludge	7.0 TPD	Cement Plant/ Fly ash brick making
2	Kiln & Cooler Dust Sealing carriage	Sludge & fines	2.0 TPD	Disposed by authorized recyclers
3	Bag Filter	Dust	14.0 TPD	Disposed by authorized recyclers
4	Product Separation System (Char)	Fines	43.0 TPD	Disposed by authorized recyclers
5	From Heat Exchanger & ESP – 2nos	Dust with Fly Ash & Non Magnetic waste	15.0 TPD	Disposed by authorized recyclers
6	From Fluidized Bed Combustion (FBC) Boiler	Fly Ash	15 TPD	Cement Plant/ Fly ash brick making
7	Sludge Drying Bed (From ETP)	Sludge	0.5 TPD	Disposed by authorized recyclers
8	Sludge Drying Bed (From STP)	Sludge	5 Kg/Day	Used as Manure

3.4 Hazardous Waste

There will be no hazardous waste generated from this unit.

3.5 Noise Level

The noise level in the inside & outside the factory will be maintained at low level.

3.0 ENVIRONMENTAL MONITORING PROGRAMME

4.1 Environmental Monitoring

The environment, safety and health monitoring programme in the factory are as follows:

Particulars	Parameter	Frequency
Stack Emissions	SPM, SO_2, NOx	Monthly
Ambient Air Quality	PM_{10},$PM_{2.5}$, SO_2, NOx	Monthly
Noise monitoring	Noise Levels	Monthly
Safety and Occupational Health	--	Yearly

4.2 Budgetary Allocation for Environmental Management

S.No	DESCRIPTION	CAPITAL COST (Lakhs)	OPERATIONAL COST (Lakhs)
1	Air pollution management	400	20
2	Water and wastewater management	50	8
3	Solid waste management	200	9
4	Greenbelt	20	2
5	Environmental monitoring	2.5	0.5
	Total	**672.5**	**39.5**

4.0 ADDITIONAL STUDIES

5.1 Socio-economic Conditions

The nearest village of karadibavi Village is having a population of 3113nos with 1570 males and 1543 females as per 2001 census data. The major

source of income of the local population is from these types of industries only.

5.0 PROJECT BENEFITS

6.1 Socio-economic benefit

The proposed project on implementation will generate 150 job opportunity at Power plant and 250 for Sponge Iron unit - potential jobs directly, and will also generate many indirect job opportunities.

Due to the proposed project, indirect employment will be generated. The Government revenue from the project will increase by way of direct and indirect taxes, duties, etc. The infrastructure development will get an impetus with this industrial growth. Communications, transport, schools, hospitals, trade and commerce will indirectly get an impetus.

6.0 ENVIRONMENTAL MANAGEMENT PLAN

7.1 Land Degradation

Since, the small quantity of wastewater will be generated from domestic usages, the chances of contamination of soil will be nil. The vacant area in the industry will be used for tree plantation to improve the surrounding environment of the industry.

7.2 Greenbelt Plan

Greenbelt is developed inside the factory premises covering a total area of about 3.28 hectare (8.1 acres). The unit will also develop the nearby area around the industry for greenbelt. The inter-spaces are laid with shrubs. The inter-space between the planted trees is about 5m. It is proposed to double the tree density in the future.

For Kannappan Iron and Steel Company Pvt Limited
(Unit II- Sponge Iron & Power Division)

Managing Director