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1.0 PROJECT DESCRIPTION

1.1 Introduction

Shree Shakambari Ferro Alloys Pvt.Ltd. (formerly known as Shree Shakambari Coke and Mining Pvt. Ltd) has proposes to set up a 8940 metric tonnes per annum Ferro Alloys-Ferro Silicon plant from 10MVA submersible arc furnace and Captive Power Plant of 10MW at Vill Riwiang Near Riangdo, West Khasi Hills, Meghalaya.

The district west Khasi Hills lies in the central part of the State of Meghalaya The district is backward as far as industry is concerned. The coming up the proposed industry will add to the existing infrastructure.

Two of the important input materials of Ferro Alloy-Ferro Silicon are found in the abundantly available within the state of Meghalaya & Assam and also in other Eastern states. However due to power deficit status of the related power utility in the state i.e. Meghalaya State Electricity Board (MeSEB), possibility of power availability on continuous basis is uncertain Ferro Alloy-Ferro Silicon units are power intensive as also require power on continuous basis. Moreover, the most vital raw material for Captive Power Plant which is Coal is available at village Nirang, West Khasi hills, Meghalaya.

1.2 Statutory Compliance:

The project is new and the company's management is very keen, as well committed for sustainable development & pollution control and committed to observe the compliance as per State Pollution control Board's & MoEF's guidelines.

In accordance with the Environmental Assessment Notification 2006 of Ministry of Environment and Forest it is mandatory to obtain environment clearance by submitting the Form-1 to set up and operate the project. The presentation of TOR was done in September 2008 before EAC (Industry) and the prescribed TOR by EAC was received in October 2009.

M/s Shree Shakambari Ferro Alloys Pvt. Ltd. engaged M/s Ecomen Laboratories (P) Ltd., Lucknow an approved laboratory from MoEF, New Delhi for preparation of the same. M/s Ecomen Laboratories (P) Ltd. have carried out necessary environmental studies & monitoring during October-December 2010 and also availed secondary data from various sources, which forms the basis of the present draft EIA/EMP report.

1.3 Site Locations

The site is located at Vill-Riwiang, BPO: Seinduly, Near Riangdo, via Nongstoin, West Khasi Hills, Meghalaya. The site is at a distance of 208 km from Shilong (State capital of Meghalaya), and 190 km from Guwahati . The NH-44 E is connecting Riwiang to Shillong .

The plant site is well connected by road from Nongstoin town, which is about 25 km from the proposed plant site. The location map is shown in **Exhibit No: 1.1**.

1.4 Topography & Drainage

The topography in the area proposed for plant site is riverine valley with undulating terrain, formed naturally at the base of riverine valley. A nominal site grading and leveling works for the main plant-site area is required. A few courses developing along the undulating profile of the surface have their flow towards Riwiang river.

1.5 Process Detail

A) Ferrosilicon Plant

Basic ingredients used for manufacture of Ferrosilicon are Quartz, Petrocoke, Mill scale.

The blended raw materials are charged to the furnace with low voltage & high current is passed through the Electrodes. All the process parameters are being controlled through PLC system. Inside the furnace the basic ore is subjected to oxidation at high temperatures between 1550 to 1750°C and are reduced through the Petrocoke. The by-products gases are let out through the highly sophisticated pollution control system and the fume dust is collected in to filter bags. The molten Ferro Alloys and the slag is tapped at regular intervals and are casted as cakes in large Cast iron casting pans. After proper solidification of these cakes they are shifted to metal handling yard for crushing, sizing, lot preparation, lot sampling, lot analysis, lot packing, lot stacking and allotting lot number for proper identification. Process flow diagram is shown as **Exhibit No 1.2**.

B) Captive Power Plant

The proposed Captive Power Plant will generate an aggregate power of 10 MW. The plant will have Coal fired Boiler of designed capacity 45 TPH and 1 extraction cum condensing Turbo-generators of 10 MW nominal capacity operating with steam cycle.

The steam cycle define the transformation of the heat energy to the mechanical energy at the turbine shaft, through the various thermodynamic processes that is capable of producing the net heat flow or work when placed between the energy source and energy sink. The heat energy is derived from burning of coals. The cycle needs a working fluid and steam is viewed as the most favoured working fluid mainly because of its unique combination of high thermal capacity, high critical temperature, wide availability at cheaper cost and non toxic nature. Higher thermal capacity of the working fluid generally results in smaller equipment for the given power output or heat transfer. Process diagram is shown as **Exhibit No 1.3**

1.6 Raw material consumption/ requirement

A) For Ferrosilicon Plant

S.NO	RAW MATERIAL	UNIT	Consumption per Ton of Metal produced
1	Quartz	Ton	1.600
2	Petro coke	Ton	1.500
3	Mill Scale	Ton	0.350
4	M.S Rounds	Ton	0.025
5	Lancing pipes	Ton	0.005
6	Casing sheet	Ton	0.003
7	Electrode carbon paste	Ton	0.060
8	Oxygen cylinders	Cum	4.000
9	Power	KWH	8000

B) Raw Material for CPP

Coal: 2000 MT equivalent to 10 days consumption

Lime Stone: 600 MT equivalents to 10 days consumption

LDO- 10 KL to be stored in a storage tank.

Covered storage shall be provided for coal and lime stone for 10 days consumption.

1.7 Water Consumption

It is estimated that a total of 250 KLd of water will be required for CPP and 62KLd for Ferrosilicon Plant and other miscellaneous purposes. The source of water is Riwiang River.

1.8. Details of Manpower

Ferrosilicon Plant & Captive Power Plant will operate for 3 shifts. Maximum strength of construction workers at peak activity will be 125 nos.

1.9 Cost of the Project

- Ferroalloy Silicon Plant :The total investment is Rs. 3017.00Lacs
- Captive Power Plant : The total cost is Rs.5678.00 Lacs

1.10 Duration of Construction

Land measuring 11.47 acre for the proposed project has already been acquired. It will take 14 months for both Ferrosilicon plant and CPP.

1.11 Power

The power requirement for the plant has been estimated as 11MVA. The power requirement will be met by the Captive power plant.

1.12 Fuel

Coal is to be used as a fuel for the power plant, which is available at village Nirang ,West Khasi hills Meghalaya.

2.0 DESCRIPTION OF ENVIRONMENT

The proposed project will come up on an area of 11.47 acre. Environmental monitoring was carried out for base line data generation during October - December 2009 for 12 weeks. Micrometeorology, Ambient air quality, Water quality, Water flow measurement, Noise level, Soil quality, Socio-economic & Biodiversity studies were carried out within 10 km radius of the site area.

2.1 Meteorological Study:

Sr. No.	Parameters	October	November	December
1.	Max. Temperature(⁰ C)	25.1	21.6	18.5
2.	Min. Temperature(⁰ C)	13.9	8.5	5.9
3.	Max. Relative Humidity (%)	77	78	75
4.	Min. Relative Humidity (%)	41	39	35

2.2 Ambient Air Quality (AAQ):

Location Name	SPM ($\mu\text{g}/\text{m}^3$)		RPM($\mu\text{g}/\text{m}^3$)		SO ₂ ($\mu\text{g}/\text{m}^3$)		NO _x ($\mu\text{g}/\text{m}^3$)	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Inside Project Site	75.0	65.0	28.0	21.0	8.0	5.0	17.0	12.10
Riwiang Village	77.00	58.00	32.00	21.00	7.4	5.6	12.5	10.6
Mobergaon village	76.0	65.0	45.0	32.0	9.0	7.5	16.2	14.3
Seinduly Town	98.0	90.0	45.0	35.0	8.80	6.60	18.10	16.00
Umjaru village	67.0	55.0	35.0	25.0	7.50	6.0	14.10	11.10
Mawiongdep	99.0	83.0	46.0	35.0	8.20	5.80	18.0	16.60

Klangrin	71.0	65.0	37.0	25.0	8.30	6.90	17.0	15.0
Tar	69.0	64.0	27.0	22.0	7.0	5.40	12.0	9.50

The results of the monitored data indicate that the ambient air quality of the region in general is in conformity with respect to rural/residential norms of National Ambient Air Quality standards of CPCB.

2.3 Ambient Noise Level:

Station Code		Noise level in dB(A)			
		Maximum	Minimum	Day (leq)	Night (leq)
Ambient Noise Level (dBA)					
Core Zone					
N-1	Inside PROJECT SITE	48.0	41.0	45.9	43.9
Buffer Zone					
N-2	RIWIANG VILLAGE (NEAR PROJECT SITE)	43.5	38.5	41.1	39.6
N-3	MOBERGAON VILLAGE	45.7	39.4	40.2	38.7
N-4	SEINDULY TOWN	56.4	42.2	44.2	41.4
N-5	UMJARU VILLAGE	44.6	39.2	42.6	38.7
N-6	MAWIONGDEP	46.6	39.0	45.5	41.4

All the values are well within the prescribed limit 55 dBA & 45 dBA for residential area in day and night time respectively.

2.4 Soil Quality:

From the results it can be concluded that the pH of soil is normal ranging from 5.6 to 5.8 .Average nitrogen values area in low to medium range (245.6 to 337.9 kg/ha), average potassium value was in medium range (230 to 254 kg/ha). The average phosphorus value were also in medium range (10.7 to 15.4 kg/ha). Biological results show good biological status. The average value of heterotrophy, counts per gm were in the range of 3.0×10^5 to 5.0×10^5 .

2.5 Water Quality:

The water samples are from upstream Riwing River (W-1) and down stream of Riwing River (W-2).

Code No.	pH	TDS (mg/l)	Chloride (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Iron (mg/l)	Total Coliform (MPN)
W-1	7.10	22.0	10.0	0.58	0.24	0.42	54
W-2	7.30	29.0	12.0	0.54	0.18	0.38	45
Desirable Limits							
IS: 2296 (Class C)	6.5-8.5	1500	600	1.50	50.00	50.00	5000

The water samples are from Naula near Riwing village (W-3), Naula near Marucsain village (W-4), Naula near Mayo ban village (W-5) and Naula near Urkali village.

Code No.	pH	TDS (mg/l)	Chloride (mg/l)	Fluoride (mg/l)	Nitrate (mg/l)	Iron (mg/l)	Total Coliform (MPN)
W-3	6.9	28.00	12.01	0.54	0.44	0.60	Nil
W-4	7.8	14.00	10.01	0.51	0.56	0.34	Nil
W-5	6.7	12.00	16.02	0.55	0.12	0.50	Nil
W-6	7.1	16.00	20.02	0.52	0.10	0.41	Nil
Desirable Limits							
IS: 2296 (Class C)	6.5-8.5	1500	600	1.50	50.00	50.00	5000

3.0 Environmental impact assessment

	Existing	Impact due to proposed activity.	Environmental management
Climate	The factors responsible for changes in climate are varied, complex & on global scale.	The activities envisaged will have negligible impact on the climate.	Project authority will initiate control measure like covering construction material stacks during construction phase. Pollution Control measures will be adopted for relevant pollutants in construction and operational phase.
Land use	New project	The land requirement for proposed project is 11.47 ha.	Project Proponent are using unused land. The proposed project would bring minute changes in landuse pattern.

Soil Quality	New project	No significant adverse impact on the soil in the surrounding area is anticipated except minor localized constructional impact.	The managements will ensure no discharge of effluents or fly ash & dust out side the factory. No land filling will be done. Slag and fly ash will be sold.
Air Quality	New project	During construction phase, suspended particulate matter SO ₂ , NO _x due to site development and vehicular movements. During operation phase source of air pollution are submerged Electric Arc system, Raw material storage and flue gases from boiler system.	Water sprinkling will be done on regular basis. Bag filters are installed at Raw material storage, raw meal preparation and coal grinding. ESP will be installed in CPP. Project Proponent will spend an amount of Rs. 655.09 lacs towards APCS and 80 lacs as recurring cost.
Noise levels	New project	Major noise generating sources are Ferrosilicon mill, crusher and power plant. In CPP noise generating sources are Turbine generator, high pressure boiler & compressor	The noise generated will be diffused by the natural distance. The noise generating equipment will be covered and acoustic noise suppression measure will be implemented. Earmuffs will provided to the staff working near high noise generating sources.
Water Quality	New project	Due to short period of constructional phase, possibility of pollution of water will be minimum. During operation phase there will be no industrial effluent generated from Ferro Alloy plant except reject water with high TDS and suspended matters from CPP.	DM Plant Effluent will be neutralized in a neutralizing Pit and then stored in a common Effluent Pit. This water will be utilized in plant for dust suppression, gardening and water sprinkling.
Water requirement & management	New project	312 KLD of water will be required for the Ferro-Silicon Plant and captive power plant per day.	The water demand will meet from the Riwing River and rain water harvesting.

Domestic Waste Water	New Project	It is estimated that domestic wastewater generation will be very less as few residential quarters are proposed.	Soak pit will be constructed for the same.
Solid Waste management	New project	<p>During Construction Phase contaminate runoff from storage will be captured in the ditches / ponds with an oil trap on the outlet instead of free flow.</p> <p>There will be very less amount of solid waste generated in the proposed plant.</p>	<p>An area of approximately 2000 sq.mt. will be kept for storage of the waste and this area will be covered by tin sheets.</p> <p>Ferro-silicon slag will be sold. Fly ash and will be sold to cement plants.</p>
Traffic Density	New project	The contribution due to the proposed plant will be 35 trucks on daily basis. The transportation vehicles will be allowed in such a manner that not to disturb the routine traffic.	Transportation of equipment and plying of heavy earth moving machineries will be done to site with proper traffic norms to ensure not to disturb the routine traffic flow of the area during construction phase. During operation phase present infrastructure is sufficient to cop up with marginal increase in traffic.
Flora & Fauna	There is no forest area, wildlife sanctuary in the study area	Impact on flora & fauna is negligible. The site is covered with grass, bushes. No endangered or rare species are reported.	Project authority will under take plantation over an area of 3.65 acres.
Socio economic	<p>The study area comprises of 39 census villages with a total population of 20127.</p> <p>No village fall in the core zone of Shri Sakhambri Ferro Alloys .</p>	<p>Due to the coming of this project, job opportunities for the local people will be generated.</p> <p>The near by villages will be developed with facilities like good road network and improve the economic structure of the area.</p>	The project authority will contribute to improve/ encourage Education, Health & Hygiene, Promotion of cultural and social welfare activities, and Training to villagers through self help group development in the nearby villages.

4.0 ENVIRONMENTAL MONITORING PROGRAMME

To evaluate the effectiveness of environmental management programme, regular monitoring of the significant environmental parameters will be taken up. The schedule, duration and parameters to be monitored are shown as under:

Sl.	Description of parameters	Schedule & duration of monitoring
1. AIR QUALITY		
	Ambient air quality-monitoring stations minimum 3 will be established inside the factory area as well outside for SPM, RPM, SO ₂ , NO _x & CO. Location of the ambient air quality stations will be decided based on the meteorological data, topographical features and environmentally & ecologically sensitive targets. Selection of monitoring stations will be done in consultation with State Pollution Control Board.	One sample (24 hourly) per day , per parameter once a month.
2. WATER QUALITY		
	Water quality of surface water will be monitored. Selection of monitoring station (min. 3) will be done in consultation with State Pollution Control Board near by spring and Riwiang river.	Physico-chemical, biological, toxic metals monthly.
3.	Stack monitoring	Boiler and other monthly
4.	Fugitive Emission	Regular Monitoring
5.	Noise Level	Regular Monitoring
6.	Soil Quality	Every year in dry season, on all plantation areas
7.	Flora & Fauna	Once in 3 years
8.	Socio-Economic	Once in 3years.

5.0 PROJECT BENEFITS

The proposed project will generate employment opportunities for 250 persons. This will be beneficial to the local people in getting jobs. Many people apart from the above will get indirect employment which will help in improving social status of people in the area.

The following are some of the community development which will be taken up by Shri Shakambari Ferro Alloys Pvt.Ltd.

Rural employment, roads, bus shelters & community hall, education, literacy campaign, rain water harvesting, medical assistance, eradication of child labour, library, sports and cultural facilities

The project proponent has earmarked an amount of Rs. 40.6 lacs for 5 years towards peripheral development. The detail programme will be discussed with the village Dorbar before finalization.

6.0 ENVIRONMENTAL MANAGEMENT PLAN

6.1 Construction Phase

i) Air Pollution

Excavated earth will be utilized to fill up low-lying areas, the rubbish will be cleared and all inbuilt surfaces reinstated. Water sprinkling will be done on regular basis and all vehicles will have valid pollution check certificate and transport the material in covered form.

- ii) **Noise:** Noise prone activities will be restricted during night (10 pm to 6 am) and on site workers will be provided ear muffs.
- iii) **Water Quality:** Temporary houses along with canteen and toilet facilities will be provided to construction workers. Lose soil will be not allowed to mix with river during rain.
- iv) **Solid Waste Management:** An area of approximately 2000 sq.m will be kept for storage of the waste covered by tin sheets and all the lose soil etc. will be provided with retaining wall to prevent the mixing of surface water.
- v) **Occupational Health:** Construction workers will be provided clean drinking waters, toilet and urinals etc.

6.2 Operation Phase:

Air Pollution:

- 1) Bag filter will be installed to ensure the outlet emission $<50 \text{ mg/Nm}^3$.
- 2) Collected dust in the hoppers of gas cooler and bag filter will be stored in borrows and further disposal.
- 3) The CPP will have ESP set of efficiency 99.95% installed for reducing the SPM levels to 50mg/Nm^3
- 4) Dust extraction and dust suppression will be provided in coal handling plant. Fugitive emission are generated from material handling systems, raw material storage yards and material movement will be suppressed by water spraying.

Water Environment:

- 1) Water is required only for cooling of furnace part. No water is required for processing. A cooling tower will be used to cool the return water and the cold water will be discharged in the water tank.

- 2) In CPP 20% of the total water demand will be fulfilled from rain water.
Rest of the water demand will be meet out from the Riwiang River

Waste Water Management

There will be no waste water generation except reject water with high TDS and suspended matters

DM Plant Effluent will be neutralized in a neutralizing Pit and then stored in a common Effluent Pit known as Guard Pond. Guard Pond will also be fed with other Process water drains such as Boiler Blow Down and Cooling Tower Blow Down. This water will be utilized in plant for Dust Suppression, Gardening, Road Water Sprinkling and Construction Water as required.

Solid Waste Management

- i) The main solid waste generated from the ferro silicon plant is slag (i.e. 10 MT/month). This slag is non-hazardous and sold to outside agency.
- ii) The main solid waste generated from CPP are Bed ash and flyash.
Bed ash will be sieved and used as refilling of bed materials in boilers and rejects can be used for road development.
Fly ash will be used as raw material in the near by cement plant. Besides, flyash can be used as road sub-base, filler in asphalt in roads and land filling material etc.

Noise Environment

The rotating equipment in the power plant will be are provided with silencers and designed in such a manner so that it can operate with a total noise level of not exceeding 85 to 90 decibal as per the requirement of occupational safety and health Administration standards.

Flora and Fauna

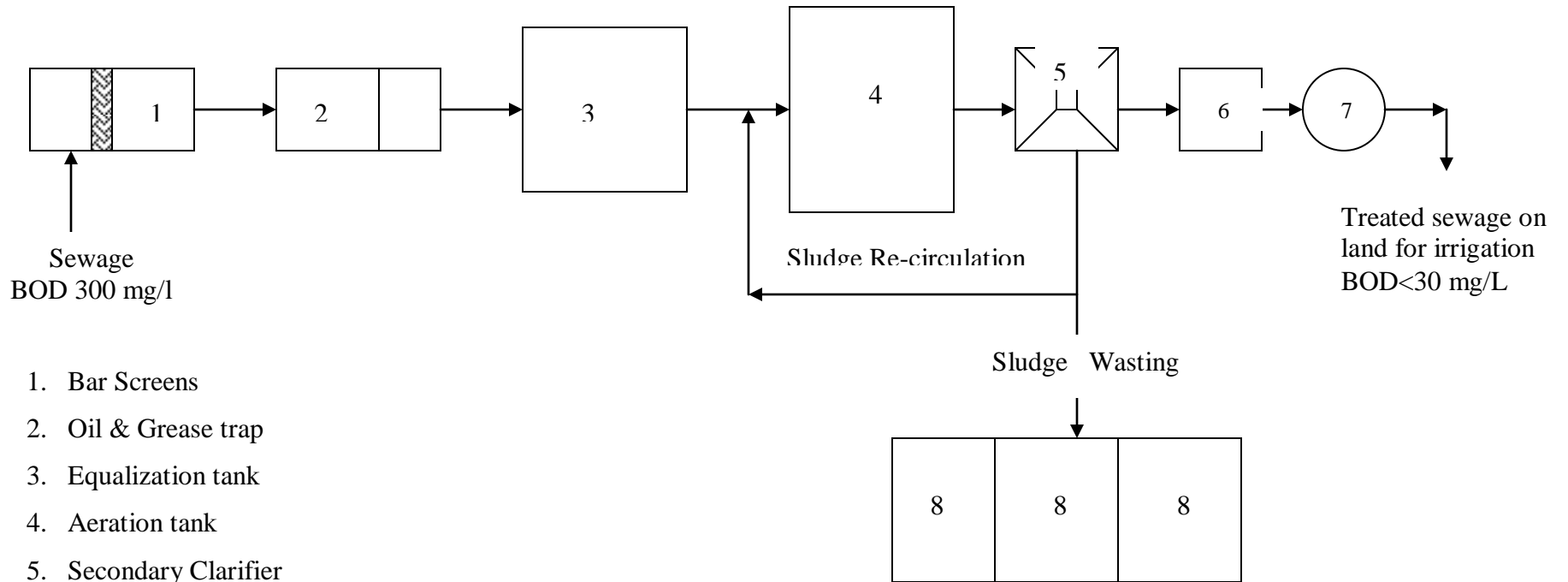
The project authority will undertake plantation over an area of 3.65 acres. Trees, road side hedges will help in lowering SO₂, airborne lead and dust. Evergreen trees, shrubs with dense foliage and large surface area, pollution resistant and less water consuming plants will be planted for pollution control.

Occupational Health

Workers in operational phase will be provided PPE facilities, dispensary to take care of mines health problem.

Water sprinklers will be provided at raw material sheds and other dust prone areas to reduce the flying dust and to keep the plant dust free.

Line Diagram of Sewage Treatment Plant (180 KLPD)



1. Bar Screens
2. Oil & Grease trap
3. Equalization tank
4. Aeration tank
5. Secondary Clarifier
6. Buffer storage tank
7. Pressure Sand filter
8. Sludge Drying beds

Manufacturing of Ferro Alloys

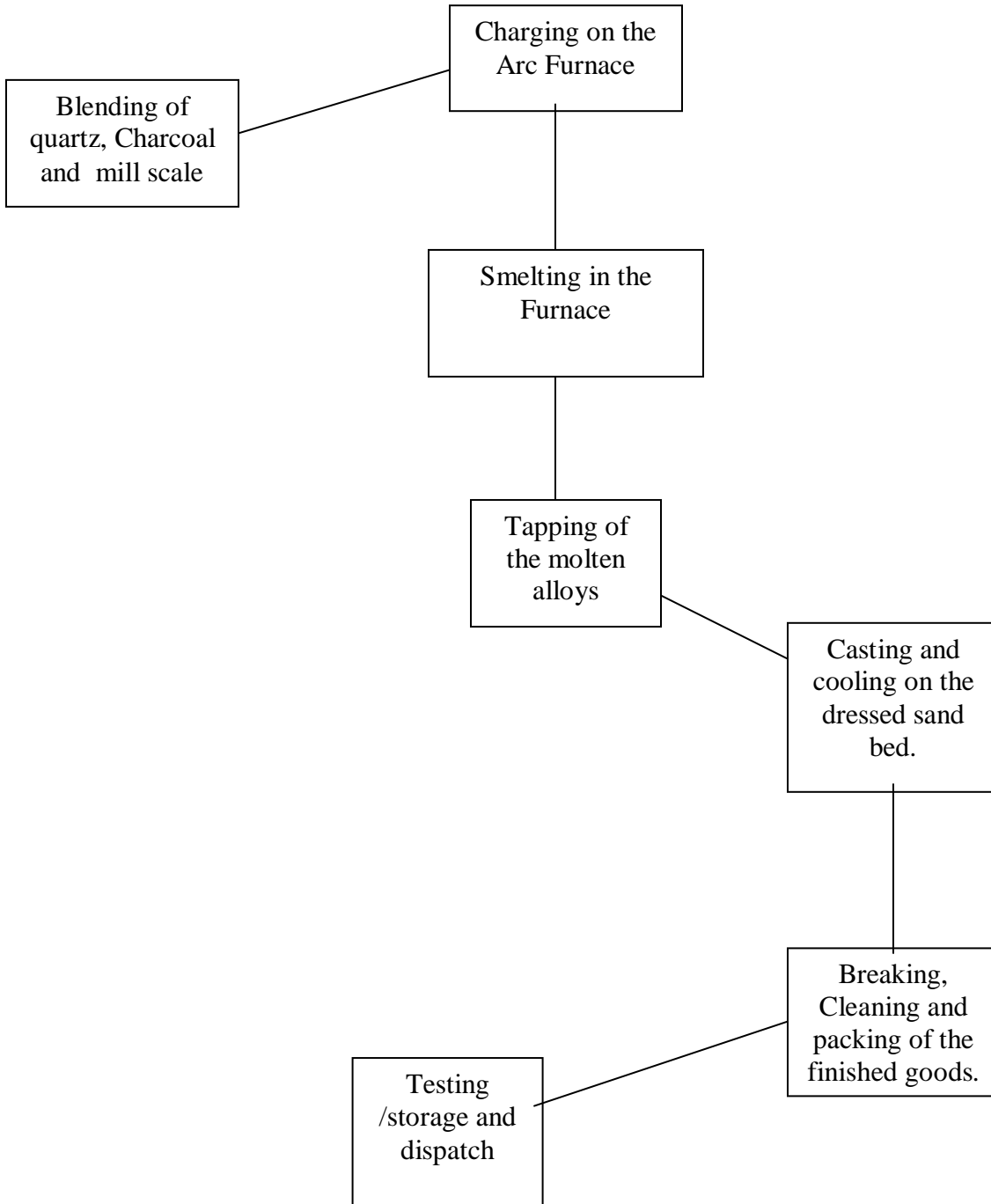


Exhibit No 1.2

Process flow diagram of Ferro Alloys Plant

