The storage of the diesel and other alternative fuels is given in **Table 7.4**.

TABLE 7.4: STORAGE OF HAZARDOUS CHEMICALS/ FUELS

Sr. No.	Type of Fuel	Storage Capacity	One time storage quantity	Type of Storage
1.	Diesel oil (HSD)	600 L (3 X 200 L Barrel)	400L (2 x 200 L Barrel)	Under shed in Barrels of size L-25 ft, B-15 ft, H-11 ft.
2.	Transformer oil in 37.5 MVA transformer	2600 L	2000 L	No separate storage. Used in transformer

The fuel and oil storage shall be at ambient conditions. Fire hydrant points and fire extinguishers are already provided at these locations and their locations are described in further sections.

ALOHA is the hazard modeling program for the CAMEO software suite of US EPA, which is used widely to plan for and respond to chemical emergencies. ALOHA allows for entry of details about a real or potential chemical release, and then it will generate threat zone estimates for various types of hazards. ALOHA can model toxic gas clouds, flammable gas clouds, BLEVEs (Boiling Liquid Expanding Vapor Explosions), jet fires, pool fires, and vapor cloud explosions. The threat zone estimates are shown on a grid in ALOHA, and they can also be plotted on maps in MARPLOT, Esri's ArcMap, Google Earth, and Google Maps. The red threat zone represents the worst hazard level, and the orange and yellow threat zones represent areas of decreasing hazard.

Hence study based on ALOHA has been carried out for fire modelling for HSD in barrels, fire modelling for transformer oil, fire hazard due to coal in coal yard. The details of consequence analysis carried out and given in **Annexure XXXIV**. The findings of the consequence analysis are as follows:

- Significant heat flux experienced at distance due to pool fire on HSD in different season (details in **Annexure XXXIV**):

TABLE 7.5: HEAT FLUX EXPERIENCED AT DISTANCE DUE TO POOL FIRE ON HSD

Storage details	Significant heat level kw/m^2	Experience at distance in m			Indication
		Summer	Rainy	Winter	
HSD 400 L	4.5	6.0	4.5	5.0	Cause pain if unable cover the body within 20 seconds. However blistering of the skin (2nd degree burn) is likely caused with no lethality.

Storage details	Significant heat level kw/m^2	Experience at distance in m			Indication
		Summer	Rainy	Winter	
	12.5	2.5	1.9	2.3	Minimum energy required for melting of plastics.
	37.5	1.4	0.8	0.6	Sufficient to cause damage to the equipment.

- Significant heat flux experienced at distance due to fire on transformer containing transformer oil in different seasons (details in **Annexure XXXIV**):

TABLE 7.6: HEAT FLUX EXPERIENCED AT DISTANCE DUE TO FIRE IN TRANSFORMER OIL

Storage details	Significant heat level kw/m2	Experience at distance in m			Indication
		Summer	Rainy	Winter	
	4.5	17.9	17.2	15.5	Cause pain if unable cover the body within 20 seconds. However blistering of the skin (2nd degree burn) is likely caused with no lethality.
	12.5	9.8	9.5	8.3	Minimum energy required for melting of plastics.
	37.5	3.0	3.8	2.9	Sufficient to cause damage to the equipment.

- Significant heat radiation experienced at distance in case of fire in coal yard (details in **Annexure XXXIV**):

TABLE 7.7: HEAT RADIATION EXPERIENCED AT DISTANCE DUE TO COAL FIRE IN COAL YARD

Storage details	Significant heat level kw/m2	Experience at distance in m			Indication
		Summer	Rainy	Winter	
	4.5	15.0	15.2	15.2	Cause pain if unable cover the body within 20 seconds. However blistering of the skin (2nd degree burn) is likely caused with no lethality.
	12.5	6.9	8.3	8.3	Minimum energy required for melting of plastics.
	37.5	2.9	3.0	3.0	Sufficient to cause damage to the equipment.

7.2.3 Risk Assessment Matrix method - likelihood versus consequences

For assessment of risk, a risk rating has been calculated in **Table 7.10 (during construction) and Table 7.11 (during operation)** for various likely hazards due to proposed expansion of ferro alloys plant operation based on the likelihood of occurrence of that hazard. **Table 7.8** gives the likelihood of occurrence of a potential hazard and their ratings. Consequence possibilities and incidents are given in **Table 7.9**. 'Likelihood' is commonly understood to be the measurement of how often an event might occur, while 'consequence' is the outcome of an event expressed quantitatively in terms of a loss, injury disadvantage or lost opportunity.

TABLE 7.8: LIKELIHOOD DESCRIPTORS FOR RISK ASSESSMENT

Likelihood of Occurrence	Rating	Description
Almost certain	5	Unwanted event is almost certain to happen (a 90% or greater chance of occurrence)
Very likely	4	High probability for unwanted event to occur (a 50% – 90% chance of occurrence)
Likely	3	It is possible for unwanted event to occur (between 20% - 50% chance of occurrence)
Unlikely	2	Low probability for unwanted event to occur (between 5% - 20% chance of occurrence)
Rare	1	Very low probability for unwanted event to occur (a less than 5% chance of occurrence)

TABLE 7.9: CONSEQUENCE DESCRIPTORS FOR RISK ASSESSMENT

Consequence	Rating	Incident
Extreme	5	Fatality or permanent disability, extreme impact/ importance
Major	4	Serious event: critical injury or critical illness, major impact/ importance
Moderate	3	Temporary disability: lost time due to injury or illness, moderate impact/importance
Minor	2	First aid treatment: no lost time, minor impact/importance
Low	1	No injury or illness, negligible impact/importance

TABLE 7.10: RISK AND POTENTIAL HAZARDS DURING CONSTRUCTION

Sr. No.	Risk Site	Nature of Hazards	Without safeguards			With Risk Mitigation Measures		
			Likelihood of occurrence	Consequence	Risk rating	Likelihood of occurrence	Consequ -ence	Risk rating
1.	Masonary & fabrication work	Physical injury such as cuts & bruises	4	3	12	2	3	6
		Exposure to dust/skin allergies	4	3	12	1	3	3
		Slips, trips and fall	3	4	12	2	3	6
		Fall down during loading and unloading	3	4	12	2	4	8
		Eye strain, inhalation during welding	2	3	6	1	2	2
		Noise exposure	2	3	6	1	2	2
2.	Plumbing work	Injury	3	3	9	2	3	6
		Slips and trips	3	4	12	1	4	4
3.	Electricity work	Fire, electrocution, injury	2	4	8	2	3	6
4.	Painting work	Inhalation of paint, solvent vapours, ingestion with food/water	3	3	9	1	4	4
		Fire	1	4	4	1	2	2
5.	Excavation	Fall	3	4	4	1	2	2
		Snake/ insect bite	1	3	3	1	1	1
6	Paving and surfacing	Slip, trips and fall, exposure to dust	3	4	12	2	3	6
7.	Carpentry work	Injury, Fall, saw dust inhalation and contact with eyes	3	4	12	2	4	8

Risk Rating = Likelihood of Occurrence × Consequence

Interpretation :
If value is between 21 and 25 then 'Critical' risk
If value is between 16 and 20 then 'High' risk
If value is between 11 and 15 then 'Moderate' risk
If value is between 5 and 10 then 'Low' risk
If value is below 5 then 'negligible' risk

By following the mitigation measures, the risk can reduce from moderate to low category.

TABLE 7.11: RISK AND POTENTIAL HAZARDS DURING FERRO ALLOYS PLANT OPERATIONAL ACTIVITIES

Sr. No.	Risk Site	Risk Item	Nature of Hazards	Without precaution			With precaution		
				Likelihood of occurrence	Consequ-ence	Risk rating	Likelihood of occurrence	Consequence	Risk rating
1.	Raw materials handling area	Metallurgical coke, coke breeze & fines, minerals and ore	Dust, toxic, injury	3	3	9	1	3	3
			fire in case of flammable raw materials	3	4	12	2	3	6
2.	Chemical handling	Water treatment chemicals like acids/ alkalis	Toxic and injury	3	3	9	2	3	6
		Lube oil/ grease	Fire	3	3	9	2	2	4
3.	Ferro alloy plant	Contamination of cooling water bleed off/ blow down	water pollution	2	2	4	1	2	2
		Hot molten metal & slag Handling	Heat radiation, contact with hot metal, injury, explosion when it comes in contact with water	3	4	12	2	3	6
		Cooling jacket & furnace (submerged arc)	Explosions, injury, heat radiation, contact with hot metal	3	4	12	2	3	6
4.	Captive power plant	Coal storage	Fire	2	3	6	1	3	3
		Boiler	Explosion, fire, steam burn, fatal	3	4	12	2	3	6
5.	Pollution control systems	Bag filter house Electrostatic Precipitator	excessive emissions due to failure of control system causing acute air	2	3	6	1	3	3

Sr. No.	Risk Site	Risk Item	Nature of Hazards	Without precaution			With precaution		
				Likelihood of occurrence	Consequ-ence	Risk rating	Likelihood of occurrence	Consequence	Risk rating
			pollution						
6.	Electric power supply & grid sub station	Electrical components, transformers, high voltage cables	Fire, burn, shock, injury due to component failure and short circuit	3	4	12	2	3	6
7.	Liquid fuel like HSD	Fuel handling & storage area	Flammable and explosive at elevated temperature	4	5	20	2	4	8
8.	Hydraulic oil and lubricants	Accidental discharge of hydraulic oil under pressure	Fire & Toxic	2	4	8	1	3	3
9.	Transformer	Transformer oil	Flammable and explosive at elevated temperature	4	5	20	2	4	8

Risk Rating = Likelihood of Occurrence × Consequence

Interpretation:

If value is between 21 and 25 then 'Critical' risk
If value is between 16 and 20 then 'High' risk
If value is between 11 and 15 then 'Moderate' risk
If value is between 5 and 10 then 'Low' risk
If value is below 5 then 'negligible' risk

It can be seen that by following the mitigation measures, the risk can reduce from moderate to low category.

7.2.4 Emergency preparedness plan

Emergency preparedness plan assist the management in responding to any unwanted event in shortest possible time and with identified resources for limiting the damage to personnel, equipment, and environment. These have two components - on site as well as offsite emergency planning, as discussed below:

(a) On site emergency planning

The onsite emergency plan for the existing plant would be related to the final assessment and it is the responsibility of the management to formulate it. The plan must, therefore, be specific to the site.

An onsite emergency plan 2023 has been prepared by the company comprising of the following:

1. **General information about the plant:** Described in section 1.4 of chapter 1.
2. **Brief manufacturing process:** Described in section 2.3 of chapter 2.
3. **Manpower:** Existing manpower is 500
4. **Product and by-product**

Sl. No.	Name of Product/ By-product	One time storage quantity	Storage type	Size of the shed
1	Silco Manganese	3600 T	Under Concrete shed jute bags	L-40 m B-25 m H- 8 m
2	Ferro Manganese	5000 T	Under Concrete shed jute bags	L-25 m B-17 m H-8 m
3	Slag(by-product)	1500 T	Low laying area / Saleable of Area 3000 m^3	-

5. **Inventory of raw materials**

Sl. No.	Name of Product/ By-product	One time storage Quantity (T)	Storage type	Size of the shed (m)
1	Manganese Ore	13,000	Concrete yard	60 x 50
2	Dolomite	2,000	Concrete yard	30 x 20
3	Quartzite	2,500	Concrete yard	25 x 20
4	Coke/Coal	5,000	Concrete yard	60 x 30

6. Inventory of hazardous substance

Sl. No.	Name of Product/ By-product	One time storage Quantity	Storage type	Size of the shed (m)
1	HSD	600 L (3 X 200 L Barrel)	400L (2 x 200 L Barrel)	Under shed in Barrels of size L-25 ft, B-15 ft, H-11 ft
2	Transformer Oil In 37.5 MVA Transformer	2600 L	2000 L	Inside the Transformer

7. Identification of hazards

As identified in **Table 7.2** earlier and summarised below:

Sl. No.	Area/ Hazard zone	Hazard	Impact
1	HSD Storage Shed	Fire may occur due to expose to heat and naked lights.	Fire will propagate within the HSD storage shed area
2	Coke/ Coal Storage Yard	Fire may occur due to expose to heat and naked lights.	Fire will propagate within the Coke/ Coal Storage shed area.
3	Transformer	Fire may occur due to rupture of the container if container is not properly cooled.	Significant heat level of 4.5 KW/m^2 will experience at distance of 17.9 m. From the transformer.

8. Identification of most credible scenario

- **Fire hazard in HSD barrel**

HSD is a flammable liquid as per Schedule -1, Part-II (b) (V) having flash point of 60°C and auto ignition temperature of 250°C and explosive limit of 5-7 % volume in air. So, it is susceptible of fire hazard. Whenever HSD catches fire it shall manifest in the form of pool fire. The significant heat flux that spread from the source in case of pool fire in HSD barrel is mentioned bellow. Significant heat flux experienced at distance due to pool fire on HSD in different season is given in **Table 7.5**.

- **Fire hazard in Transformer oil in transformer**

Transformer oil is a flammable liquid as per schedule -1, Part-II (b) (v) having flash point of 144°C, auto ignition temperature of > 270°C and explosive limit of 0.7% volume in air. So it is susceptible to fire hazard. Whenever transformer oil catches fire it shall manifest in the

form of pool fire. The significant heat flux that spread from the source in case of pool fire in Transformer oil is mentioned below. Significant heat flux experienced at distance due to fire on transformer containing transformer oil in different season is given in **Table 7.6**.

- **Fire hazard in coal yard**

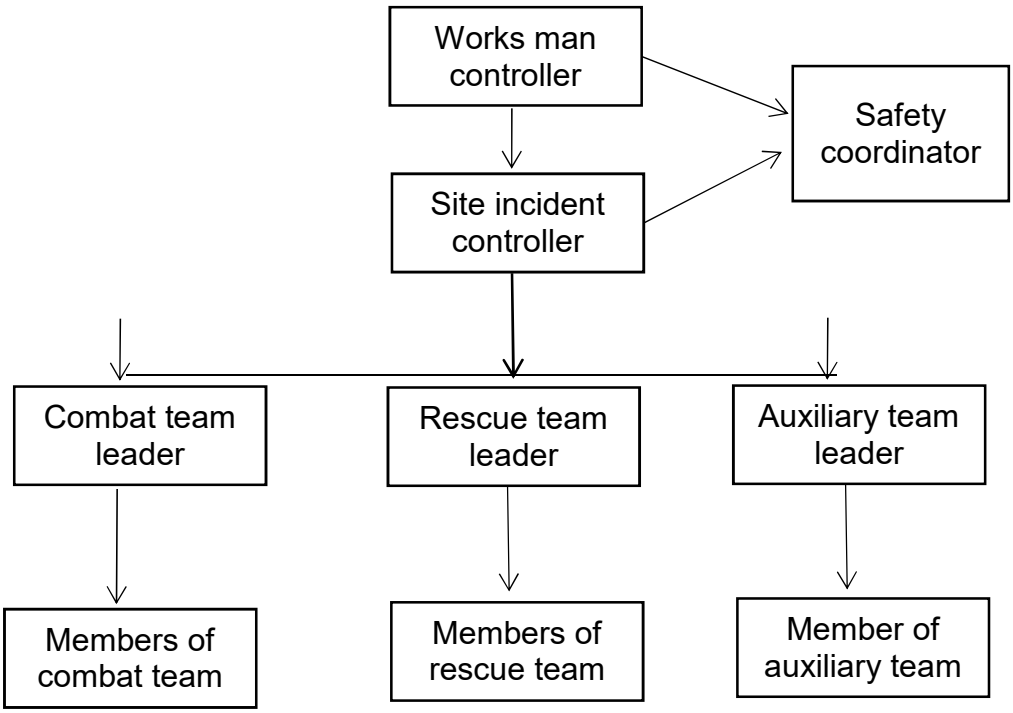
During storage of coal in the coal yard, weathering of coal takes place due to mild oxidation, which is an exothermic process. If the heat liberated is not completely dissipated, the temperature of coal rises as coal is a bad conductor of heat. The rate of oxidation is doubled with 10°C, rising temperature. The bulk of coal may reach critical temperature i.e. its ignition point 50-80°C and may burst into flame.

Significant heat radiation experienced at distance in case of fire on coal yard for different season is given in **Table 7.7**.

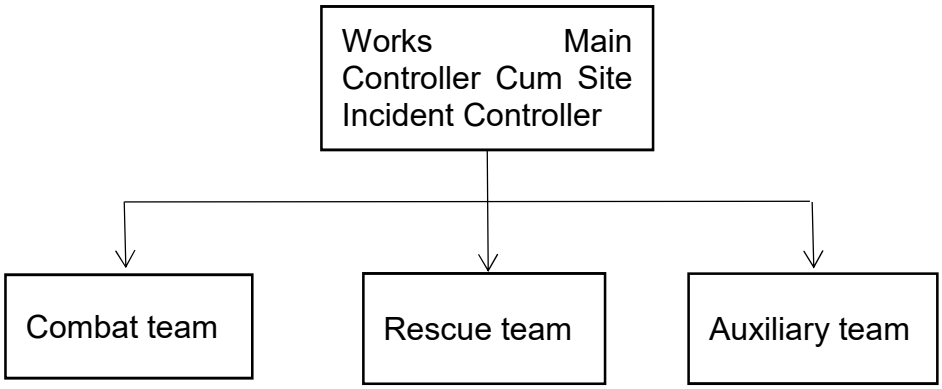
9. Plot plan: The plot plan has been prepared in the project and it shows the following zones and places:

- Hazard zone
- ISO-risk contour around Hazard zone
- Emergency control room
- Assembly exit
- Fire hydrant line

10. Emergency command structure



11. Silent hour command structure



12. Action plan for on-site emergency

Sl. No.	Initiator	Action to Take
1	The person Noticing the Emergency	● Inform the Security Gate and the concerned Shift Incharge who in turn inform Works Main Controller immediately regarding the fire hazard.
2	Works Main Controller (WMC)	● On being informed, rush to the emergency Control Room ● Declare of emergency by blowing the siren in appropriate code [intermittent three times with half minutes interval] ● Make continuous review and asses the possible developments to ● determine the extent of damage to plant and human beings. ● Shutdown the plant, if necessary ● Ensure that casualties are receiving adequate attention ● Liaise with the fire services, police services and other statutory authorities. ● Declare closure of the emergency by blowing the siren [only once long siren for 25 seconds] ● Issue the authorized statements to the media services. ● Report all statutory authorities in prescribed manner ● Communicate to employees about the mishap, measures taken and giving confidence to employees for avoiding recurrence of the incident by investigation and ordering

Sl. No.	Initiator	Action to Take
		preventive measures to be implemented.
3	Site Incident Controller (SEC)	● On hearing emergency siren, rush to the scene and report to the Works Main Controller ● Make quick assess about the gravity of the scene and appraises Works Main Controller ● Extend all sorts of help through different agencies to minimize the damage to human being, plant, property and environment ● Shutdown of plant & Machinery ● Undertake continuous review of the situation time to time and appraise to Works Main Controller ● Providing the required information to the fire brigade team for fire fighting ● Preserve the evidence for the subsequent injuries ● Make liaison between the various working teams ● Extend all possible help needed during the Emergency
4	Combat Team	● On hearing emergency siren, rush to the scene ● Shutdown the plant and Machinery & Isolate the affected area ● Arrange of Isolation of Electrical Power Supplier all around the affected area ● Alert the entire employees through PA System ● Operating the fire fighting equipment's and materials and also to shift to effected site.
5	Rescue Team	● On hearing emergency siren, rush to the scene ● Guide the non-essential person to reach assembly point ● Search the missing person on the roll call basis ● Rescue all the effected persons ● Search for casualties and evacuate non-essential person from spot

Sl. No.	Initiator	Action to Take
6	Auxiliary Team	● On hearing emergency siren, rush to the scene ● Inform about the emergency to Statutory Authorities depending upon situation. ● Shift the injured persons to hospital by ambulance after providing necessary first aid. ● Seek help of Mutual Aid Partners and Co-ordinate with Mutual Aid ● Partners to render their service if required. ● Arrange to inform the relatives of Casualties. ● Take care of visit of the authorities to the Emergency Site

In order to make the disaster management more effective the workers and rescue team have been and will be provided with the safety equipment and items like gas mask respirators, fire entry suits, fire blankets, rubber shoes or industrial shoes, rubber glove, ladders, ropes, torches etc.

13. Activation and closing procedure for on-site emergency

- Anybody notices “FIRE” and informs to shift-in-charge (or smoke detector indicates fire alarm installed in the emergency control room).
- Being inform about fire, the Shift-in-charge informs Works Main Controller and Site Incident Controller.
- On hearing about the fire, Works Main Controller and Site Incident Controller rush to the scene and make quick assessment of the situation.
- On quick assessment of the situation, the Works Main Controller rush to the emergency control room and declare emergency by blowing appropriate siren code (Intermittent three times with half minutes interval).
- On hearing emergency siren the key personal of Emergency Combat structure perform their duties and responsibilities as per the worksheet.
- During the emergency operation, the Works Main Controller keeps records of activities carried on, supervises overall, maintain liaison with mutual aiders, statutory authorities.
- After being controller the situation, the Works Main Controller declares normalcy by blowing appropriate siren (three minutes continuously).

14. Casualty Services

The casualty services section is and will be headed by a trained first aider who will be responsible for immediate medical aid and first aid. The First Aid Centre will be fully equipped with all first aid medical facilities. An ambulance will be on duty round the clock to tackle the emergency. On receiving the call of emergency, the medical officer will report immediately to disaster site along with mobile first aid equipment and ambulance. The immediate first aid will be made available and the medical officer will assess further line of action in the best interest of victim.

15. Specific Treatment

Specific treatment / preventive measures for injuries and hazards will be provided in the Medical Centre. Eye and body showers are and will be provided in different required places of plant identified by the Safety Officer.

The emergency, critical cases & diseases which cannot be treated shall be referred & treated at larger hospitals in the district or Medical Colleges or super specialty hospitals.

(b) Off-site emergency plan

Off site emergency plan is an integral part of any major hazard control system. It should be based on those accidents identified by the works management, which could affect people and the environment outside the works. Thus, off site emergency plan follows logically from the analysis that took place to provide the basis for the on site emergency plan and the two plans should therefore complement each other.

The key feature of a good off site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan. The role of various parties that may be involved in the implementation of an offsite plan are described in detail. The responsibility for the off site plan will be likely to rest either with the works management or with the local authority.

7.2.5 Risk reduction measures

The risk reduction measures will comprise of various component as described in sub-sections below.

7.2.5.1 Safety department

Safety department has been and shall continue to be manned by experienced engineers and other supporting staff who shall bring safety consciousness amongst the work force of plant. The safety department will conduct regular safety awareness courses by organizing seminars and training of personnel among the various working levels.

7.2.5.2 General safety rules

At the plant where fuels chemicals and other materials are reactive in nature following general guidelines are being and will be made.

- Fitting dress and use of personnel protective equipment recommended for respective job should be adhered to by everyone.
- All unsafe conditions or natural occurrences should be reported promptly to the supervisor/ head of the department of safety.
- No matchbox or lighter to be used

7.2.5.3 Personal protective equipment (PPE)

Personnel protective equipment play vital role in reducing the losses in case of an accident. They provide protection to the workmen from injuries during the execution of job. Personal protective equipment being used and to be used is given in **Table 7.5.**

Sl. No.	Unit	Hazard	Injury	Use of PPE
1.	Material handling and storage	• Dust pollution • Hands going between running parts of conveyors • Machine's sound	• Eye Injury, Dust inhalation • Physical injury • Hearing system damage	a) Safety Goggles b) Eye wash taps c) Safety boot, d) Hand leather gloves c) Ear muffles
2.	All manufacturing units	• Dust pollution, • hand going into parts of machines/ conveyors, • body part touching hot components, • machine's sound, • explosion/ blast, • hot air/ steam release, • hot metal spillage	• Burn injury, • Physical injury, • Fatality, • Damage to ear drum	a) Safety Goggle b) Eye wash taps c) Safety boot, d) Hand leather gloves, e) Leather aprons f) Safety Helmets

7.5.2.4 Industrial Safety

For protection of working personnel, equipment and machineries from any damage or loss and to ensure uninterrupted production, adequate safety and fire fighting measures have been planned for the proposed expansion of ferro alloys plant. Provisions shall be as follows:

- Laying down specific Safety, Health & Environment policy.
- Provision of adequate personal safety appliances to workers engaged in hazardous installations.

- Safety inspections / monitoring at regular intervals by a team of experienced professionals to guide & educate the workforce.
- Provision of detection and alarm system for detection of fire at an early stage.

Plant uses a wide variety of specialized equipment and methods for handling raw materials. These equipment ranges from the most basic forklift to Cranes, Hoists, Conveyors, etc. The hazards of using powerful equipment and of moving heavy materials require a wide variety of protective measures for employees on the site. The work talks about regulatory requirements and safe use for this equipment. The work covers safe rigging and slings for proper lifting and safety requirements for specific types of Cranes, Hoists, Conveyors and forklifts. Bearing this in mind the cranes and lifts shall be periodically tested and certificate issued for continuous use.

7.2.5.5 Emergency control room

- P & T Phone – 01
- Wind direction and speed indicator – Top of the administrative building
- Windsock – Top of the administrative building
- Wallboard for fixing up and drawing and drawing pins, Flip charts, Drawing sheets and Sketch pens
- Switch for actuating the siren, drinking water arrangement, tables, chairs, etc.
- Details of address and telephone numbers of key personnel of emergency command
- structure, statutory authorities and mutual aiders
- Worksheet of key personnel of emergency command structure
- Applicable siren code
- Safety manual
- List of emergency telephone numbers (external and internal)
- Local P & T telephone directories
- List of people working in the installation, location wise
- List of residential address of employees/contract workers and casual workers
- Red / Green flag – 6 nos each

7.2.5.6 Assembly point

In an emergency, it will be necessary to evacuate people from the affected zones or the zones likely to be affected, to safe areas. The safe areas are identified and designated as Assembly points (AP). The location of the assembly point is the vacant place shown in the plot plan. Arrangements for taking head count of persons, reconciling the head count with the attendance rolls, temporary shelter and further evacuation if necessary to safer place outside factory campus can be made.

7.2.5.7 Wind Socks

During emergency, the knowledge of exact wind direction helps the factory personnel to decide on the escape route to be taken for safe evacuation of personnel and also the safe assembly point and Emergency Control Centre, Therefore, the windsock is provided at the top of the administrative building for easy identification of wind direction.

7.2.5.8 Emergency communication

For communicating the declaration of an emergency and evacuation decision to the plant personnel, it is envisaged that the siren would utilized. Declaration of emergency: - Intermittent three times with Half minute interval Normal Factory Siren: - Continuous for 30 secs. All-clear signal: - Continuous for 3mins.

7.2.5.9 Emergency medical arrangement

The first-aid box is available in each department, via Security Office, Admin Building, Project Office, Bunker House (RMHS), Furnace Control Room, 11KV Indoor Elect., Q.C., Workshop, Store. First-aid boxes are maintained in each department. Adequate stock of essential medicines, bandages and other appliances are being maintained.

7.2.5.10 Fire hydrant system

Fire Hydrant point are provided inside the plant as shown in plot plan. Fire hydrant hoses are 63 mm dia in size. Two motors of 55 kw having capacity of discharging water 180 m^3/hr are provided to main header to maintain a pressure of 7kg/cm^2. In case of temporary power failure, the fire pumps are run by DG. One water reservoir of capacity 3000 KL is supplying water to the fire main line. The fire hydrant system shall be enhanced for the expansion phase and installed in the new buildings.

7.2.5.11 Fire extinguisher

In addition to above, the different type of fire extinguishers have been provided at strategic fire prone locations in the plant which are and given in **Table 7.12**. The fire extinguishers shall be additional purchased and installed for the expansion phase.

TABLE 7.12: DIFFERENT FIRE EXTINGUISHERS AT DIFFERENT SITES

Sl. No	Location	Description	Capacity (In Kg)	Nos
1	Main Gate	DCP	9 Kg	02
2	Weigh Bridge	CO2	4.5 Kg	01
3	Admin Building	DCP	3 Kg	03
4	Mrp control room	Co2	4.5	02
5	MRP Electrical Room	Co2	4.5	02

Sl. No	Location	Description	Capacity (In Kg)	Nos
6	Canteen	CO2	4.5	01
7	Project office	DCP	9 Kg	01
8	Project office	CO2	4.5	01
9	18 MVA LT Room	DCP	9 kg	03
10	18 MVA LT Room	CO2	9 Kg	01
11	18 MVA Control room	DCP	9 kg	03
12	18 MVA 2nd Floor	DCP	9 kg	03
13	18 MVA 2nd Floor	CO2	9 Kg	03
14	18 MVA 2nd Floor	DCP	50 kg	02
15	18 MVA 3rd Floor	CO2	9 Kg	03
16	18 MVA 3rdFloor	DCP	9 kg	03
17	18 MVA 3rd Floor	Foam type	9 kg	03
18	18 MVA 3rd Floor	CO2	4.5Kg	02
19	18 MVA 4th Floor	CO2	4.5Kg	02
20	18 MVA 4th Floor	DCP	9 Kg	02
21	18 MVA 5th Floor	DCP	5 Kg	02
22	Day-Bin 18 MVA	CO2	4.5Kg	02
23	9MVA LT Room	CO2	9 Kg	01
24	9MVA Control Room	CO2	9 Kg	02
25	9MVA Control Room	DCP	9 Kg	02
26	09 MVA 2nd Floor	Foam type	50kg	02
27	09 MVA 2nd Floor	CO2	9 Kg	02
28	09 MVA 2nd Floor	DCP	9 Kg	02
29	09 MVA 3rd Floor	DCP	9 Kg	02
30	09 MVA 3rd Floor	CO2	9 Kg	02
31	09 MVA 4th Floor	Co2	4.5	02
32	Dey Bin 9 MVA	CO2	9 Kg	01
33	Dey Bin 9 MVA	DCP	9 Kg	02
34	132KV Sub station	DCP	50 Kg	01
35	132KV Sub station	DCP	9 Kg	05
36	132KV Sub station	CO2	9 kg	06
37	Store	DCP	9 Kg	02
38	Quality Control	CO2	4.5 Kg	03

7.5.2.12 Siren

Company has Siren/hotter arrangement, which can be activated manually during fire related emergency.

7.5.2.13 Communication

Public address system and EPABX telephone is available for effective communication inside the plant. Telephone directory is available in the entire department.

7.5.2.14 Hoardings for awareness

1. Wear only cotton/approved work clothes while on duty in the plant.
2. Don't resort to short cuts.
3. Don't attempt to operate any equipment to which you are not specially assigned.
4. Don't use the defective equipment's of any kind.
5. Use the PPE to work safely.
6. Insist your fellow workers to observe the safety rules.
7. Take instruction from your supervisor before starting any new works.
8. Report all injurious/dangerous occurrence to your supervisor.
9. Curing emergency be strictly guided by the emergency action plan.

7.3 TYPE OF DISASTERS AT FERRO ALLOYS PLANT

Disaster can be natural or man made which have a negative impact on society or environment or both.

1) Natural disasters

A natural disaster is the consequence of a natural hazard (e.g. earthquake, flood, cyclone, etc.) which affects humans. The damage is caused by the lack of appropriate emergency management leading to financial, environmental and human life loss. Due to the location of this plant, cyclone is the first and foremost natural hazard followed by flooding, earthquake, etc. Even though the project is not near the coast but is likely to be affected by cyclone, it falls in wind & cyclone very high damage risk zone as seen in **Fig 7.5**.

2) Man-made disasters

The man-made disasters shall be caused by human action, negligence, error, or involving the failure of a system. Human-made disasters can be termed as technological disaster. Technological disasters shall be the results of failure of technology involving material, design, system or operational failures.

7.3.1 Natural disasters

7.3.1.1 Seismic & Earthquake risk management

The state of Odisha falls in a region of low to moderate seismic hazard. As per IS 1893:2002 (Part-1), Bureau of Indian Standards (BIS), the plant area falls in Seismic Zone II. Historically Odisha has experienced very few

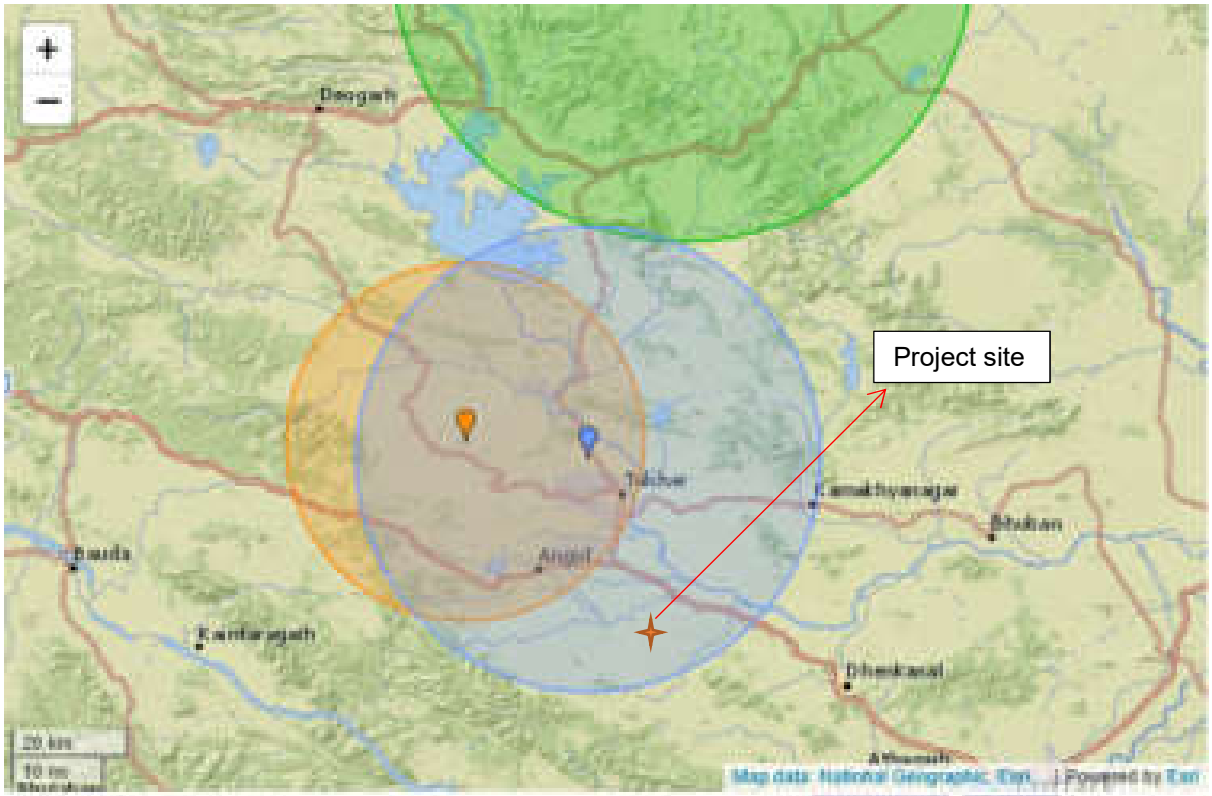
moderate to large earthquakes. Some events with magnitudes in excess of 5.0 have originated in the Bay of Bengal off the coast of the state. The seismic Zonation map and multi hazard map of Dhenkanal District from Odisha State Disaster Management Agency is given in **Fig 7.3** and **7.4** respectively.

FIG 7.3: SEISMIC ZONE MAP OF ODISHA



(Source: http://orienvis.nic.in/index1.aspx?lid=25&linkid=23&langid=1&mid=1 accessed 30.12.2022)

FIG 7.4: LOCATION OF NEAREST EARTHQUAKE IN THE PAST



(Source: https://earthquaketrack.com/in-21-bhubaneshwar/recent accessed 30.12.2022)

No major earthquake has been noticed in the plant area. However, details of the earthquakes in last 3 decades near Dhenkanal district is given below.

Date	Description
13 June 2021	Near Angul, Orissa, Magnitude 4.0 Epicenter at 21.029 N, 84.97 E
19 January 1986	Near Talcher, Odisha, Magnitude 4.4 Epicenter at 21.003 N, 85.172 E
21 June 1995	Near Kiki Buru, Orissa, Magnitude 4.7 Epicenter at 21.78 N, 85.327 E

Although in Odisha there has been no reported occurrence of earthquake of high magnitude, the Odisha State Disaster Management Authority (OSDMA) regularly conducts mock exercise on earthquake at school level in the earthquake prone district of the state to educate and raise awareness amongst school children and general public on various aspects of earthquakes, their impacts and measures to mitigate losses awareness. Awareness is disseminated among public by displaying Do's and Don'ts on Earthquakes safety in the website of OSDMA. For rescue operation after an earthquake the Odisha Disaster Rapid Action Force (ODRAF) personnel's and Fire personnel are continuously being trained on Collapsed Structure Search & Rescue (CSSR) for response and evacuation in case of an earthquake[1].

Despite the low level of seismicity and the proximity of low magnitude earthquake that has occurred in the region, the construction of the buildings is and will be done as per National Building Code and IS 875. In case of damage due to earthquake, the disaster management shall be done in line with National Disaster Management Authority's system.

There is no threat of landslide at project site, it being flat in topography

Management Measures:

Things that need to be done for mitigation of impacts due to earthquakes shall be as follows:

- During construction, the various building by laws and BIS codes are and will be followed the list of Indian standard codes for earthquake design of structures include IS 1893, IS 4326, IS 13827, IS 13828, IS 13920, IS: 13935.
- A common meeting point inside the plant site and a contact outside the plant will be identified and known to all employees and workers.
- List important telephone numbers and torch, water, transistor, first-aid kit and non-perishable food will be kept at a designated place. An emergency kit shall be ready at all times.

[1] Source: https://www.osdma.org/earthquake-2/#gsc.tab=0 accessed 24.04.2023

- Workers shall be trained in basic first aid. Teams for first-aid; search and rescue etc. will be formed in the area and preparedness drills will be conducted for what to do in case of an event.

In case of occurrence of the earthquake, every individual would have to follow the points below. These points will be communicated to the employees during training sessions:

- Keep calm and help others to keep calm. Do not panic.
- Person inside building: Protect yourself by ducking under sturdy table, and staying there until the shaking stops. Turn off electricity and gas.
- Person on the road in a built up area: Immediately move away from buildings, slopes, streetlights, power lines, hoardings, fly-overs etc. into open spaces. Do not run or wander; keep the roads free for movement.
- Person driving: Stop the vehicle away from the buildings, slopes and electric cables; come out of the vehicle, hold it and stay by its side
- Keep calm and expect aftershocks.
- Use first-aid and wait for medical help.
- Do not move seriously injured people.
- Do not turn-on electrical appliances and gas.
- Check your building for damages.
- Do not waste water and do not block telephone lines.
- Do not spread rumours and don't panic.
- Volunteer to help.
- Keep the streets clear for emergency services.
- Do not use matches, lighters, camp stoves or electrical equipments, appliances until you shall be sure there shall be no gas leaks. They may create a spark that could ignite leaking gas and cause an explosion and fire.
- Do not use your telephone except for a medical or fire emergency. It could tie up the lines needed for emergency response. If the phone doesn't work send someone for help.

For general structural safety, the following codes are and shall be followed:

- IS: 456:2000 (reaffirmed 2021) - "Plain and reinforced concrete - Code of practice (Fourth Revision)"
- IS: 800-2007 (reaffirmed 2017) - "General construction in steel - Code of practice (Third Revision)"

- IS: 801-1975 (reaffirmed 2021) - “Code of practice for use of cold - Formed light gauge steel structural members in general building construction (First Revision)”
- IS 875 (Part 2):1987 (reaffirmed 2018) - Code of practice for design loads (Other Than Earthquake) for buildings and structures: Part 2 imposed loads (Second Revision)
- IS 875 (Part 3):2015 (reaffirmed 2020) - “Design Loads (Other than Earthquake) for Buildings and Structures - Code of Practice Part 3 Wind Loads (Third Revision)”
- IS 875 (Part 5):1987 (reaffirmed 2018) - “Code of practice for design loads (Other Than Earthquake) for buildings and structures: Part 5 special loads and load combinations (Second Revision)”
- IS: 883:2016 - “Design of Structural Timber in Buildings - Code of Practice (Fifth Revision)”
- IS: 1904:1986 (reaffirmed 2020) - “Code of practice for design and construction of foundations in soils : general requirements (Third Revision)”
- IS1905:1987 (reaffirmed 2017) - “Code of practice for structural use of unreinforced masonry (Third Revision)”
- IS 2911-1-4:2010 (reaffirmed 2020) - “Design and construction of pile foundations - Code of practice: Part 1 concrete piles: Sec 4 precast concrete piles in prebored holes (First Revision)”

For Earthquake Protection, the following codes shall be followed:

- IS: 1893:1984 (reaffirmed 2018) - “Criteria for earthquake resistant design of structures (Fourth Revision)”
- IS: 1893 (Part 1) : 2016 (reaffirmed 2021) - “Criteria for Earthquake Resistant Design of Structures - Part 1 : General Provisions and Buildings”
- IS: 1893 (Part 2) : 2014 (reaffirmed 2019) - “Criteria for Earthquake Resistant Design of Structures Part 2 Liquid Retaining Tanks”
- IS: 1893 (Part 3) : 2014 (reaffirmed 2019) - “Criteria for Earthquake Resistant Design of Structures Part 3 Bridges and Retaining Walls”
- IS: 1893 (Part 4) : 2015 (reaffirmed 2020) - “Criteria for Earthquake Resistant Design of Structures Part 4 Industrial Structures Including Stack - Like Structures (First Revision)”
- IS:13920-1993 (reaffirmed 2021) - “Ductile Design and Detailing of Reinforced Concrete Structures Subjected to Seismic Forces - Code of Practice (First Revision)

- IS:4326-2013 (reaffirmed 2018) - "Earthquake resistant design and construction of buildings - Code of practice
- IS:13828-1993 (reaffirmed 2018) - "Improving Earthquake Resistance Of Low Strength Masonary Buildings - Guidelines
- IS:13827-1993 (reaffirmed 2018) - "Improving Earthquake Resistance Of Earthen Buildings - Guidelines"
- IS:13935-2009 (reaffirmed 2019) - "Seismic Evaluation, Repair and Strengthening of Masonry Buildings - Guidelines"

7.3.1.2 Flood Hazard

A perusal of the flood zone map of Odisha state given in **Fig 7.5** shows that the project area lies in the area of "no flood zone".

FIG 7.5: FLOOD POTENTIAL MAP ODISHA STATE



Source: http://orienvis.nic.in/index1.aspx?lid=25&mid=1&langid=1&linkid=23 accessed 30.12.2022

Flood management

In case of extreme scenario of occurrence of flood in study area, people from the nearby-flooded villages might flock for shelter to the higher elevations and this project could be one of their refuges in times of distress. Hence, arrangement of flood shelter is proposed in the project as follows:

- Several clean containers for water, large enough for a 3-5 day supply of water.
- A 3-5 day supply of non-perishable food and a non-electric can opener.
- A first aid kit and manual and prescription medicines and special medical needs.
- A battery-powered radio, flashlights, and extra batteries.
- Sleeping bags or extra blankets.
- Water-purifying supplies, such as chlorine or iodine tablets or unscented, ordinary household chlorine bleach.
- Baby food and/or prepared formula, diapers, and other baby supplies.
- Disposable cleaning cloths, such as "baby wipes" for the whole family to use in case bathing facilities are not available.
- Personal hygiene supplies, such as soap, toothpaste, sanitary napkins, etc.
- An emergency kit for your car with food, flares, booster cables, maps, tools, a first aid kit, fire extinguisher, sleeping bags, etc.
- Rubber boots, sturdy shoes, and waterproof gloves.
- Insect repellent containing DEET or Picaridin, screens, or long-sleeved and long-legged clothing for protection from mosquitoes which may gather in pooled water remaining after the flood.

7.3.1.3 Cyclone

A perusal of the wind and cyclone zone map of Odisha state given in **Fig 7.6** shows that the project area lies in the area of “cyclone zone”. Coastal districts of Odisha are exposed to floods and cyclones. The Bay of Bengal, located in the northeast of the Indian Ocean, is responsible for the formation of some of the strongest and deadliest tropical cyclones in the world. The strongest storm in the bay was the 1999 Super Cyclone. The 1999 Super Cyclone is the strongest storm to hit the Indian coast as well as Odisha coast, as well as the strongest in the basin till date, with a minimum central pressure of 912 mbar (26.93 in Hg). Dhenkanal district is vulnerable to cyclones from June to October. Once every few decades a super cyclone strikes Odisha. Super Cyclone that hit Odisha in the last Century were in 1942, 1971 and 1999.

List of cyclones in last 10 years

- Cyclone Jawad in 2021
- Cyclone Gulab in 2021

- Cyclone Yaas in 2021
- Cyclone Amphan in 2020
- Cyclone Bulbul in 2019
- Cyclone Fani in 2019
- Cyclone Titli in 2018
- Cyclone Hudhud in 2014
- Cyclone Phailin in 2013

Source:https://odishatv.in/news/weather/here-s-list-of-cyclones-that-odisha-has-witnessed-so-far-176216 assessed on 03.03.2023

FIG 7.6: CYCLONE ZONE MAP ODISHA STATE



Source: http://orienvis.nic.in/index1.aspx?lid=25&linkid=23&langid=1&mid=1 accessed on 30.12.2022

Cyclone management

The immediate steps to be taken after the hit of cyclone as per the disaster management plant prepared by the company are as follows:

- Make sufficient stock of food grains or food packets, kerosene lanterns and other dry food commodities are available for distribution to the victims.
- A large number of people are likely to become homeless as their houses may wash away or get destroyed hence, make arrangements for proper shelter materials such as Tents, Water, Blankets, Utensils, etc.

- Medicines (Painkiller, Surgical cotton and Bandage Materials, Orthopedic Material etc.), Dry cell Batteries / Torches, Solar operated Equipment such as Lights, Pumps & other related equipment etc
- Medical and Veterinary Departments should be fully equipped with required Drugs and Vaccines for taking preventive steps after cyclone and to arrest the spread of epidemics.
- All the Government vehicles should be kept in road-worthy condition for putting them to use in the emergency.
- Power failure is likely to occur in affected areas hence a list of generators available with other undertakings should be maintained by the Officials of State Electricity Board and advance action taken immediately to procure them when necessity arises. Electricity Board should clear the roads of fallen electric poles and restore power supply as quickly as possible.
- Communications facilities are likely to get disrupted; (both land and telecommunications) hence make immediate arrangements for satellite phones, mobile phones, etc.
- Spare Road Market Stores, Steel poles, Bamboos, G.C. Sheets, and Slotted Stripes of metal (to be laid on churned up road surface for better transportation).
- Double handle saws (for cutting fallen trees), shovels, candles, land hailers, hose pipes, first aid kits, cyclone duty sign boards, rods, asbestos, sheets, torch lights, cans, empty oil drums, gunny bags and sand bags, polythene bags, (for dropping supplies), buckets, V.H.E. sets with batteries for use
- Fodders, pumps for bailing out water along with hose speeds, crow bars, hard gloves, Eucalyptus oil, naphthalene balls, bamboo mats, phenyl slate line, etc., useful for burying dead bodies.

7.3.2 Man made disasters

The disaster may occur due to following hazards in the project such as fire, explosion, oil spillage, electrocution, exposure to hazardous waste, accidents due to machinery, hot metal spill and other plant processes. In any plant there are various activities or areas which pose substantial threat to the workers and, hence, hazardous in nature. The emergency management plant to manage such man made emergencies has been given Section 7.2.4(a).

7.4 OUTSIDE ORGANISATIONS INVOLVED IN CONTROL OF DISASTER

In the event of massive spillage of fuel oil or occurrence of fire people inside and outside the plant boundaries, vegetation and animal etc. may be affected. In such circumstances secondary fire may also take place. In such an event, help shall be taken from outside agencies also.

The Authorities that are and shall be involved are as follows:

(a) District Collector, Dhenkanal and Addl. District Magistrate, Dhenkanal

(b) District Fire Officer, Dhenkanal

(c) Chief District Medical Officer, Dhenkanal

(d) Police Station, Motunga

(e) Fire Station, Hindol road

(f) Director of Factories & Boilers, Odisha

(g) Deputy Director of Fectories & Boilers, Angul division

(h) Asst. Director of Factories & Boilers, Dhenkanal

7.5 INTEGRATION WITH DISTRICT DISASTER MANAGEMENT PLAN

'District Disaster Management Plan- DDMP 2019-20' has been prepared by District Disaster Management Authority, Dhenkanal and foreworded by Collector-cum-Chairperson, DDMA, Dhenkanal, Odisha. The District Disaster Management Plan addresses the micro and macro level preparation in case of a disaster taking place. The plan tells us mitigation, preparedness and prevention actions are to be taken before a disaster to reduce the probability of a disaster (risk reduction) or the level of damage (vulnerability reduction) expected from a possible disaster. Vulnerability reduction is given priority over a risk reduction. The salient features of the plan are:

- team work has been created, where head to head responsibility has been decided.
- All the Taluka/Nagar Palika have been given details of Resource Inventories, Geographical conditions & skilled man power and possible disaster.
- They also have a search and rescue team, medical paramedical assistance, maintenance of law and order during the disaster occurrence.
- Apart from Search and Rescue and First Aid, the schools have been given an action plan and their teachers have been trained for that.
- The Industrial sector of the District have been asked to prepare an action plan which can be implemented during the disaster. For this, "Mutual – Aid Scheme" is developed as an advanced preparation for the remedy of industrial accidents.

The disaster management structure in the State is as per the Disaster Management Act – 2005 and Odisha Disaster Management Rule-2010. Dhenkanal district has existing institutional arrangements in place for addressing the roles / responsibilities envisaged through the above provisions.

7.6 SUMMARY OF THE PROCEEDING OF PUBLIC CONSULTATION

The public hearing will be held on the basis of the prepared report, which includes the Terms of Reference prescribed by the Ministry of Environment Forest & Climate Change. Various points will be raised by the local people and NGOs before or during the public hearing. The same will have to be replied to and the points requiring action from the Company shall be clearly addressed and their execution outlined. The summary of the proceedings of the public consultation and the actions taken or to be taken by the company shall be covered in this section after the completion of the public hearing.

CHAPTER 8

PROJECT BENEFITS

8.1 EMPLOYMENT AND BUSINESS OPPORTUNITY

Rungta Mines Limited (Ferro Alloys Division) intends to expand the existing ferro alloys plant from 0.055 MTPA to 0.293 MTPA.

Employment opportunity: During operation of expansion of ferro alloys plant from 0.055 MTPA to 0.293 MTPA, 1500 additional persons will come under direct employment of the company. The existing plant has 500 direct manpower. Thus, the total manpower for existing and proposed expansion plant shall be 2000. Many more persons will be indirectly engaged either on contract basis or in transportation of materials in provision of different services associated with the project. As majority of unskilled and semi-skilled persons will be from the surrounding villages, benefits will extend to the local population. Only skilled, engineers, managerial staff and technical experts may have to be others hired from outside.

Business opportunity: In 21st century, India is ambitiously heading towards becoming a developed country. For achieving this economic growth ferro alloys industries are going to be an important sector because ferro alloys are used as a raw material for making steel and allied products. The proposed ferro alloys plant will boost steel production. Consequently, this will lead to trade and business opportunity between proposed plant and steel industries/local sellers available in domestic as well as international markets. Ultimately, this will lead to economic growth in the surrounding area.

8.2 IMPROVEMENT IN SOCIAL AND PHYSICAL INFRASTRUCTURE

Ferro Alloys Plant is already operational, amenities for communication, canteen, education, health, etc. have developed as part of the plant or as part of Corporate Social Responsibility (CSR) activities by improving the infrastructure in the surrounding villages. These amenities are available to worker families, local people and even those not associated in the project related activities.

With the proposed enhancement also, there shall be substantial improvement in the overall economy of the local people in the form of additional income through employment, development of infrastructure in surrounding areas such as transport facility, health and education, shops, ancillary industries etc. as part of CSR activities. Over and above, the people can avail any of the medical/ educational facilities that are established by the company in the area.

Following are being and will continue to be carried out in the surrounding villages:

1) Repair and maintenance of roads
2) Plantation of trees
3) Repair renovation and/ or extension of existing school buildings and/ or their boundary walls
4) Repair/ construction of community buildings
5) Installation of hand pumps, digging of wells/ tubewells for water supply
6) Improving sanitation infrastructure in rural areas.
7) Scholarship in school for local children who excel in academics
8) Medical/ health checkup camps
9) Funds for community activities/ functions
10) Help line board at highway showing the emergency numbers which are useful at the time of any emergency and accident etc.

8.3 CORPORATE SOCIAL RESPONSIBILITY

8.3.1 Activities of the company in past

Company believes in growth with a human face, and pursuing people-centered development. Company is a socially committed organization and a socially responsible corporate citizen. It attaches great importance to discharging its overall social responsibilities to the community and the society at large where its project is located. People of these localities are directly and indirectly associated with the Company.

Expenditure incurred by the Company on the activities under CSR in Financial Year 2021-22 are given in **Table 8.1**.

TABLE 8.1: CSR ACTIVITIES & EXPENDITURES DONE IN PAST

Heading (Financial Year 2021-22)	**Amount, Rs. Lakhs**	**Heading** (Financial Year 2022-Dec 23)	**Amount, Rs. Lakhs**
Construction of Boundary Wall along with drain and Development work of Shree Radhakrishna Temple	15	Development and Renovation activity of Jatadhari/Kaliaka temple in village Kochilamada.	0.89
Provision of drinking water through deep bore well with RO plant for Motonga village.	10	Construction of one Additional Class room at Nodal U.P. school in village Motonga	1.24
Construction of Boundary wall of	5	Construction of Boundary	9.9

Heading (Financial Year 2021-22)	**Amount, Rs. Lakhs**	**Heading** (Financial Year 2022-Dec 23)	**Amount, Rs. Lakhs**
Motonga UP School		Wall along with drain and Development work of Shree Radhakrishna Temple vide HO Approval No-CBSA/CIVIL/21-22/175Dt:20.09.2021	
Construction of CC road 200 mtr length in village Motonga near Radhakrishna temple.	7.5	Provovision of drinking water through deep bore well with RO plant for Motonga village Vide HO Approval No. CBSA/CIVIL/21-22/319 Dt.15.01.2022	6.99
Financial assistance for promotion of cultural activities and community festivals in village Motonga	2.5	Construction of CC road 200mtr length in village Motonga near Radhakrishna temple CBSA/CIVIL/21-22/319 dt. 15.01.2022	5.81
Construction of CC road From Kothaghar to Maa Laingabauti temple in village Chradagadia	10	Construction of CC road From Kothaghar to Maa Laingabauti temple in village Chradagadia Vide HO Approval No. CBSA/CIVIL/21-22/175 dt. 20.09.2021	8.19
Additional class room (1no) on Charadagadia village school	5	Construction of Boundary wall of Motonga UP School	0.75
Provovision of drinking water through deep bore well with RO plant for Charadagadia village.	10	Construction of CC road in village Chitapada	2.44
Construction of balance finishing work of Mausi Maa Mandir in village Chradagadia.	2.5	Additional class room in Charadagadia village	1.12
Financial assistance for promotion of cultural activities and community festivals in village Charadagadia	2	Financial assistance for promotion of cultural activities and community festivals in village Motonga	0.8
Financial assistance for promotion of cultural activities and community festivals in village Chitapada/Bhanupada	0.25	Financial assistance for promotion of cultural activities and community festivals in village Charadagadia	1.1
Financial assistance for celebration of Independence day and Repulic day in different nearby villages.	0.5	Financial assistance for promotion of cultural activities and community festivals in village Kochilamada	0.05
Subscription for promotion and development of traditional art and culture (Mohastav in district and Panchayat level)	1.5	Financial assistance for promotion of cultural activities and community festival of Periphery villages under Panchayat (Sibapur, Meramandali, Nagari, and	0.3

Heading (Financial Year 2021-22)	Amount, Rs. Lakhs	Heading (Financial Year 2022-Dec 23)	Amount, Rs. Lakhs
		Ranjasinga etc.)	
Financial assistance for promotion of cultural activities and community festivals in village Kochilamada	1.5		
Construction of CC road in village Bhanupada/Chitapada	8		
Development of Sagadagola road in village Kochilamada.	4.5		
Additional class room of Kochilamada village school	5		
Construction and Development of Jatadhari temple in village Kochilamada	5		
Total	**95.75**	**Total**	**39.58**

Photographs of some activities carried out under CSR are shown in **Fig 8.1**.

FIG 8.1: PHOTOGRAPHS OF SOME ACTIVITIES CARRIED OUT UNDER CSR



CC road 200 m. long, 3.5 m wide, village Motanga



CC road 200 m long, 3.5 m wide, village Charadagadia



Construction of RO Plant Room in village Motanga



Construction of Rest Room in Premises of Jatadhari Temple in Village Kochilamada

8.3.2 Proposed CSR expenditure

The CSR Budget shall be as per the Companies Act 2013 which states that two percent (2%) of the average net profit of the company for last 3 (three) financial years as per the Annual Report of the company has to be allocated for CSR. Company has a “Committee of the Executives of the Company” in order to look after the day to day activities, recommendations of release of payments, certifying the completion of work etc. and which are and will in turn report to CSR Committee on quarterly basis. Committee of Executive meets and will continue to meet at regular intervals to ascertain the accomplishment of work/ release of payment.

8.3.3 Need assessment

The need assessment for infrastructure and/ or facilities has been carried out for the Village level observations to identify deficiencies or needs around the Rungta Mines Limited, within a radius of 1 km. The villages include Meramanadali, Bhanupada, Chitapada and Chararhagarhia. Additionally, the amenities as reported for the villages in Census 2011 were studied. The summary of the sector wise findings, their present status, identified deficiency and proposed intervention is discussed in **Table 8.2.**

The deficiencies that have been observed during field survey will be the driving force behind the preparation of budget for future activities. The stated activities mentioned in the proposed intervention will be carried out in consultation with the government authorities and the agencies in-charge of the respective infrastructure in the areas of interest.

TABLE 8.2: PRESENT PHYSICAL & SOCIAL INFRASTRUCTURE, NEED ASSESSMENT AND PROPOSED INTERVENTIONS IN VILLAGES AROUND M/S RUNGTA MINES LIMITED (FERRO ALLOYS DIVISION)

Sector	Present status	Identified Deficiencies	Proposed intervention
(1)	(2)	(3)	(4)
1. Roads	➢ The village roads are already developed in Bhanupada, Chitapada and Charadagadia. ➢ Street lights are less in these villages.	➢ Less availability of street lights.	➢ Provision of street lights.
2. Drinking Water	➢ Drinking water requirement is met through borewells but is not adequate during hot weather, festivals, etc.	➢ Adequate drinking water supply system is required in villages.	➢ Provision of water supply through mobile water tankers to surrounding villages in need.
3. Sanitation & solid waste management	➢ Toilets are available in households. ➢ Lack of proper implementation of solid waste management	➢ Due to lack of proper disposal of solid waste, more chances of vector breeding are there which will results in diseases among the people.	Under Swachh Bharat Mission, Company will focus on improvement of overall hygiene & cleanliness by: ➢ Awareness camps about solid waste segregation and household composting. ➢ Purchase and distribution of dustbins for garbage collection for solid waste disposal among villagers. ➢ Intensive awareness drive among residents to prevent water logging and mosquito breeding
4. Market access and local livelihood means	➢ Weekly market is present in Chitiparha. ➢ Local people are involved in cultivating and agriculture activities.	➢ Youth need training in ITIs in different vocations to prepare themselves for recruitment in the upcoming project. ➢ Other vocations, which are not dependent on industries also need to be taught to local	➢ The company will help in imparting the industrial training to youth for skill development. ➢ More imparting training to build capacity for self-employment [stitching, embroidery, tailoring, pickles, etc.) for women in villages

Sector	Present status	Identified Deficiencies	Proposed intervention
(1)	(2)	(3)	(4)
		people. ➢ Programs shall be initiated to make women self-reliant.	➢ Training to people for improvement of agriculture and agriculture based products
5. Education	➢ Primary school are available in all the villages. ➢ Aanganwadi is available in the villages ➢ Middle School and Secondary schools are also available in the villages	➢ Facilitate the expansion of existing primary schools into middle and later secondary school. ➢ The students need to be encouraged to excel more in studies.	➢ Repair/ renovation and/ or extension of existing school buildings and/ or their boundary walls/toilets etc. ➢ More provision for scholarship to meritorious students and students from economically weaker sections. ➢ Distribution of Stationary items such as Bags, Study Material (slate, globe, maps charts, exercise book, duster, chalk etc.) as per demand from school. ➢ More cultural programs to be introduced in the village schools.
6. Health Care	➢ Health facilities such as chemist shop, diagnostic centers, health centres and ambulance facilities are available in the area. ➢ Nearest Government hospital is present at a 1.3 km distance of Meramandali village.	➢ General steps required to make medical access easier for local people	➢ To provide free consultation and medicines to nearby villagers in health camps, having doctor, para-medical staff and medicines.
7. Sports and entertainment	➢ Adequate sports field and facilities ➢ Community Centre is available in villages	➢ Motivation given to players to excel. ➢ Provision of organization of community feast outside community centre.	➢ Sponsorship to rural sports events ➢ Sponsorship and more encouragement to local talent to participate at state & national levels ➢ Provide equipment to village level teams in different sports such as cricket, football and badminton etc.

8.4 ENVIRONMENT BENEFITS

The project has the following environment benefits such as:

1. Air pollution control equipment (dry fogging system, bag filters, electro static precipitators) will capture dust from fugitive or process operation of furnaces, sinter plant, beneficiation plant, captive power plant in expansion phase.
2. Domestic waste generated from the plant office, organic component of which shall be composted/ vermi composted and reused.
3. 100% slag (Si-Mn, Fe-Si and Fe-Cr) will be sent to metal recovery plant and the waste from the metal recovery plant will be used as construction sand.
4. 100% dust will be reused in Sinter Plant.
5. 100% of the ash is also proposed for reutilisation as per Fly Ash Notification
6. 100% of treated waste water from process as well as sewage will be reused with the project site
7. 100% of the sewage sludge will be composted and used as manure
8. 33% of the area shall be under three tier green belt. Green belt will act as carbon sink to sequester carbon, pollutant sink as well as noise absorber

8.5 OTHER TANGIBLE BENEFITS

The proposed ferro alloys plant by nature serves as the source of economic development for in the area around it. Such units usually have input-output linkages with the other industries.

The demand for spares, assemblies and sub-assemblies by such industries are generally met through the supply of these items from small-scale units located nearby.

The present project is likely to accelerate industrialization in the study area. It is important to note that such units are usually labour-intensive and high priority industries from social point of view. This is expected to play a major role in the future economic and social development of this area.

CHAPTER 9

ENVIRONMENTAL COST BENEFIT ANALYSIS

The scope of the EIA/EMP has been prescribed vide Standard Terms of References (TOR) issued by MoEF&CC, New Delhi vide letter no. IA-J-11011/515/2022-IA-II(IND-I) dated 01.12.2022 (**Annexure I**).

As per SO 1533 dated 14th September 2006, this chapter is to be prepared if prescribed at scoping stage. The prescribed scope require environmental cost benefit analysis as point 9 under EIA/EMP report section of Standard TOR in line with Appendix III of EIA, 2006 applicable to Proposals under Industry-I Sector. The analysis carried out is given in subsequent paragraphs.

9.1 COST BENEFIT ANALYSIS

For the purpose of cost benefit analysis of the project, the following have been calculated as follows and given in **Table 9.1**.

i. Net present value

The Net Present Value (NPV) consist of a mixture of costs and benefits occurring over time. Net present value is merely the algebraic difference between discounted benefits and discounted costs as they occur over time. The formula for NPV is:

$$NPV = \frac{B_1 - C_1}{(1+i)^1} + \frac{B_2 - C_2}{(1+i)^2} + \ldots + \frac{B_T - C_T}{(1+i)^T}$$

where T = year, B = benefits, C = cost, i=discount rate.

ii. Benefit cost ratio

$$BCR = \left[\frac{B_1}{(1+i)^1} + \ldots + \frac{B_T}{(1+i)^T}\right] \div \left[\frac{C_1}{(1+i)^1} + \ldots + \frac{C_T}{(1+i)^T}\right]$$

iii. IRR is the annual earnings rate of the project

$$\left[\frac{B_1}{(1+r)^1} + \ldots + \frac{B_T}{(1+r)^T}\right] - \left[\frac{C_1}{(1+r)^1} + \ldots + \frac{C_T}{(1+r)^T}\right] = 0$$

Or

$$\left[\frac{B_1}{(1+r)^1} + \ldots + \frac{B_T}{(1+r)^T}\right] - \left[\frac{C_1}{(1+r)^1} + \ldots + \frac{C_T}{(1+r)^T}\right]$$

Some Inputs & assumptions are:

Sl. No.	Parameters	Values
1.	Duration of project (years)	30
2.	Discount Rate	8.95%

Components	Sale Price (Rs. Lakhs/tonnes)	Production, TPA	Income due to sale, Rs. lakhs
Ferro Manganese	0.89	2,99,376	2,61,105
Silico Managnese	0.85	2,30,800	1,96,180
Ferro Chrome	0.98	2,30,400	2,25,792
Ferro Silicon	1.3	1,02,400	1,33,120
Pig Iron	0.28	3,69,600	1,03,488

Note : considering maximum for calculation of IRR

Likely escalation in sale price	5% per annum
Capital cost consists of initial investment	Rs. 95,000 lakhs in 84 months
Additional Capital cost after initial construction	Nil

Recurring cost comprises of raw material, wages, taxes (GST, tax on profit), depreciation, overheads, interest & finance charges, R&M, other variable costs and considered as follows:

- 10% of investment during years of construction
- Half operational cost from 4th year and full operational cost from 8th year from the construction
- 5% cost escalation every subsequent year thereafter

TABLE 9.1: COST BENEFIT ANALYSIS

Year operation	NPV Calculations							Cost Benefit Calculation		
	Capital Cost of Project, Rs. lakhs	Variable Cost of Project, Rs. lakhs	Total Cost, Rs. lakhs	Benefit (from sale), Rs. lakhs	Benefit (-) cost, Rs. lakhs	Discount Factor	Discounted Annual Cash flows, Rs. lakhs	Cumulative Discounted Cost, Rs. lakhs	Cumulative Discounted Benefits, Rs. lakhs	Benefit to Cost ratio
	15900	1,590	17,490	-	-17,490	1.000	-17,490	17,490	-	0.00
	15900	1,590	17,490	-	-17,490	1.000	-17,490	34,980	-	0.00
	15900	1,590	17,490	-	-17,490	1.000	-17,490	52,470	-	0.00
1		33,123	33,123	130,552	97,429	1.090	89,384	88,575	142,302	1.61
2	15900	34,713	50,613	130,552	79,939	1.187	67,345	148,653	297,268	2.00
3	15900	34,713	50,613	130,552	79,939	1.293	61,824	214,096	466,072	2.18
4	15500	34,673	50,173	130,552	80,379	1.409	57,047	284,790	650,020	2.28
5	0	66,247	66,247	261,105	194,858	1.535	126,943	386,479	1,050,816	2.72
6	0	69,559	69,559	274,160	204,601	1.672	122,369	502,782	1,509,211	3.00
7	0	73,037	73,037	287,868	214,831	1.822	117,909	635,855	2,033,706	3.20
8	0	76,689	76,689	302,261	225,572	1.985	113,638	788,083	2,633,695	3.34
9	0	80,523	80,523	317,374	236,851	2.163	109,501	962,254	3,320,175	3.45
10	0	84,549	84,549	333,243	248,694	2.357	105,513	1,161,536	4,105,629	3.53
11	0	88,776	88,776	349,905	261,129	2.567	101,725	1,389,424	5,003,836	3.60
12	0	93,215	93,215	367,400	274,185	2.797	98,028	1,650,147	6,031,455	3.66
13	0	97,876	97,876	385,770	287,894	3.048	94,454	1,948,473	7,207,283	3.70
14	0	102,770	102,770	405,059	302,289	3.320	91,051	2,289,669	8,552,079	3.74
15	0	107,909	107,909	425,312	317,403	3.617	87,753	2,679,976	10,090,433	3.77
16	0	113,304	113,304	446,578	333,274	3.941	84,566	3,126,507	11,850,395	3.79
17	0	118,969	118,969	468,906	349,937	4.294	81,495	3,637,360	13,863,879	3.81
18	0	124,917	124,917	492,352	367,435	4.678	78,545	4,221,722	16,167,100	3.83

Year operation	NPV Calculations							Cost Benefit Calculation		
	Capital Cost of Project, Rs. lakhs	Variable Cost of Project, Rs. lakhs	Total Cost, Rs. lakhs	Benefit (from sale), Rs. lakhs	Benefit (-) cost, Rs. lakhs	Discount Factor	Discounted Annual Cash flows, Rs. lakhs	Cumulative Discounted Cost, Rs. lakhs	Cumulative Discounted Benefits, Rs. lakhs	Benefit to Cost ratio
19	0	131,163	131,163	516,969	385,806	5.097	75,693	4,890,259	18,802,093	3.84
20	0	137,721	137,721	542,818	405,097	5.553	72,951	5,655,024	21,816,360	3.86
21	0	144,607	144,607	569,959	425,352	6.050	70,306	6,529,896	25,264,610	3.87
22	0	151,837	151,837	598,457	446,620	6.592	67,752	7,530,806	29,209,636	3.88
23	0	159,429	159,429	628,379	468,950	7.182	65,295	8,675,825	33,722,657	3.89
24	0	167,400	167,400	659,798	492,398	7.824	62,934	9,985,563	38,884,920	3.89
25	0	175,770	175,770	692,788	517,018	8.525	60,647	11,484,002	44,790,941	3.90
26	0	184,559	184,559	727,428	542,869	9.288	58,448	13,198,186	51,547,290	3.91
27	0	193,787	193,787	763,799	570,012	10.119	56,331	15,159,116	59,276,173	3.91
28	0	203,476	203,476	801,989	598,513	11.025	54,287	17,402,439	68,118,103	3.91
29	0	213,650	213,650	842,089	628,439	12.011	52,322	19,968,590	78,232,429	3.92
30	0	224,333	224,333	884,193	659,860	13.086	50,425	22,904,211	89,802,978	3.92
						NPV=	**2,384,013**			
						IRR=	**0.88**			

9.2 COST EFFECTIVENESS ANALYSIS

Cost-effectiveness analysis (CEA) is an alternative to cost-benefit analysis (CBA). CEA is useful when analysts face constraints which prevent from conducting CBA. The most common constraint related to the inability to monetize benefits. However, in this case, the Cost Benefit Analysis has been carried out for the project and given in **Table 9.2**.

However, to address the intangible environmental aspects of the project, the following non-monetary costs and benefits have also to be considered for operation phase when compared to a no project scenario:

TABLE 9.2: COST EFFECTIVENESS ANALYSIS

<table>
<tr><th>Sl. No.</th><th>Parameter</th><th>Cost</th><th>Benefit</th><th>Benefit/ Cost (subjective)</th></tr>
<tr><td>1.</td><td>Topography</td><td>There will be permanentchange in topography over part of additional 37.869 ha land for construction of plants, facilities & tailing management (20.042 ha), Stock yards (1.012 ha), solid waste management (2.023 ha), Administrative buildings(0.405 ha), Roads (1.89 ha) and Green belt & plantation (12.497 ha).</td><td>Leveling of land will make it easier to manage harvested rain water, plant vegetation and reduce soil erosion.</td><td>Neutral</td></tr>
<tr><td>2.</td><td>Drainage</td><td>Natural drain of water occurs through the expansion area although the drainage is not well defined. Distrubance of this runoff shall take place. The existing plant area already has a drainage system.</td><td>Storm water drainage is already constructed in existing plant and will be constructed in expansion phase to systematically manage rain water during monsoons and care shall be taken to settle suspended solids prior to discharge of runoff.</td><td>Neutral</td></tr>
<tr><td>3.</td><td>Climate</td><td>The impact shall be there due to burning of fossil fuel and emission of green house gases from process and transportation.

Cost of fossil fuels: Rs. 13,587 lakhs/ annum (for max. production of Fe-Si after expansion, sinter & CPP)
<table>
<tr><th>Product</th><th>Fossil fuel required</th><th>TPA</th><th>Rate, Rs./T</th><th>Annual cost. Rs Lakhs</th></tr>
<tr><td>Fe-Mn</td><td>Coke</td><td>20,371</td><td>13,587</td><td>2,767</td></tr>
<tr><td>Sinter plant</td><td>Coke Fines</td><td>8,500</td><td>19,656</td><td>1,670</td></tr>
<tr><td>CPP</td><td>Coal</td><td>3,000</td><td>7,12,174</td><td>21,365</td></tr>
<tr><td></td><td></td><td></td><td>Max in a year</td><td>25,802</td></tr>
</table></td><td>There are existing 17,705 trees in the existing plant area.

Approximately 31,250 trees over an expansion area of 12.497 ha shall be planted within project boundary.

Economic benefit[1] of Tree for one year = (31,225+17,705) trees X Rs. 0.745 lakhs = Rs. 36,471 lakhs.</td><td>Positive (Rs. 10,669 lakhs/ annum)</td></tr>
</table>

[1] *According to the report submitted by 5 members SC committee comprised of Soham Pandya, B K Maji & others (refer case "Special Leave Petition (Civil) No. 25047 of 2018"), the monetary value of a tree is to be counted as – its age multiplied by Rs. 74,500.*

Sl. No.	Parameter	Cost	Benefit	Benefit/ Cost (subjective)
4.	Ambient air quality	• Emission into air through process stack & transportation vehicle. • Increment in GLC estimated for stack are as follows: PM_{10} 21.79, $PM_{2.5}$ 15.18, SO_2 33.97, NO_2 10.22 $\mu g/m^3$ • Increment in GLC estimated for transportation are as follows: PM_{10} 0.14, $PM_{2.5}$ 0.03, SO_2 0.00, NO_2 0.03 $\mu g/m^3$ • Cost of pollution control equipment for expansion = Rs. 3366 lakhs for 30 years life	Nil.	Negative (Rs. 112.2 lakhs/ annum capex when divided by life of project)
5.	Water resource	Water required for process and domestic use shall be 5688 KLD after expansion. Cost of water is Rs. 5.44/ KL. Annual Surface Water consumption charges = Rs. 108.29 lakhs/ annum	Total rain water harvesting = 2,59,525 KL/ annum X Rs. 5.44/ KL = 14.12 Lakh	Negative (Rs. 94.17 Lakhs/ annum)
6.	Water quality	• Waste water released from process (6.78 KLH) • Sewage water (4.22 KLH) released from domestic users. • Industrial effluent and sewage treatment systems cost of Rs. 37.7 lakhs (~1.25 lakhs/annum CAPEX distribution for 30 years)	However, no discharge of effluent outside the boundary but effluent 100% reused. Total water recycled = 263.9 KLD X 350 days = 92,365 KL/ annum X Rs. 5.44/ KL = Rs. 5.02 lakhs/anum	Positive (Rs. 3.77 Lakhs/ annum)
7.	Noise level	Increase of noise level from operation activities. Provision of acoustics at a cost of Rs. 16 lakh in ferro-alloy plant to minimise noise level	Nil	Negative (Rs. 0.53 lakhs/ annum capex when distributed over life of project)
8.	Traffic volume	Pollution control measures for fugitive dust control = Rs. 51 lakhs capital expenditure (~1.7 lakhs/annum for 30 years)	Nil	Negative (Rs. 1.7 lakhs/ annum)
9.	Land Environment	The expansion area includes approx. 81.695 acres (33.062 ha) agricultural land. Out of this 41.76 acres (16.9 ha) has to be purchased. The cost of agriculture land =41.76 acre x Rs.10 lakh/acre =Rs. 4176 lakhs The main crop which is sown is paddy and total production of paddy per acre is 25 Quintal annually, wholesale price of 1 Quintal paddy is Rs. 2,000 . Agricultural loss = 41.76 acre x 25 quintal/acre x Rs. 2,000 per quintal = Rs. 20.88 Lakh Hence,total cost for loss of agricultural land = Rs. 4196.88Lakh	Sale due to manufacturing on converted industrial land use, say, for ferro manganese = Sale Price (Rs. Lakhs/tonnes) X Production, TPA X Income due to sale, Rs. Lakhs = 0.89 X 2,99,376 = Rs. 2,61,105 lakhs Assuming 10% is profit = Rs. 26,110.5 lakhs 2% of this will be given as CSR = Rs. 522.21 lakhs/annum, which will be in addition to wages, indirect income and income	Negative Rs. 3674.67 lakh

Sl. No.	Parameter	Cost	Benefit	Benefit/ Cost (subjective)
			due to business opportunities	
10.	Soil Quality	Deterioration of soil quality due to construction activities	Topsoil generated during construction will be preserved for green belt and plantation.	Neutral
11.	Ecology- Flora	Total no. of trees in plot area is 300 out of which 100 trees will be transplanted and 200 will be cut. Cost of 200 trees = 200 trees X Rs. 0.745 lakh = 1.49 lakh	There are existing 17,705 trees in the existing plant area. Approximately 31,250 trees over an expansion area of 12.497 ha shall be planted within project boundary. Economic benefit[2] of Tree for one year = (31,225+17,705) trees X Rs. 0.745 lakhs = Rs. 36,471 lakhs.	Positive (Rs. 36,469.51 lakhs/ annum, already included in point 3 earlier)
12.	Ecology- Fauna	No large mammal present. Small mammals like squirrel, common hous rat, Indian hare and avifauna present who will be temporarily disturbed during construction.	During operation, the green belt will be existing and small mammals, reptiles and avifauna shall find permanent improved microhabitat	Neutral
13.	Socio-economic- Displacement, land acquisition; employment; social welfare, etc	There is no displacement cost. Land acquisition cost is accounted in point 9 earlier.	Wages estimated for 1500 additional workers as Rs. 6024 lakhs/annum. Peripheral development and social welfare activities shall be 2% of the annual average profit of the previous three years once the plant becomes operational (accounted in point 9 earlier). Also separate budget for fulfilling commitments raised in public hearing	Positive (Rs. 6024 lakhs/annum)
			Total	**+ 12,813.5 Lakhs/ Annum**

[2] *According to the report submitted by 5 members SC committee comprised of Soham Pandya, B K Maji & others (refer case "Special Leave Petition (Civil) No. 25047 of 2018"), the monetary value of a tree is to be counted as – its age multiplied by Rs. 74,500.*

CHAPTER 10

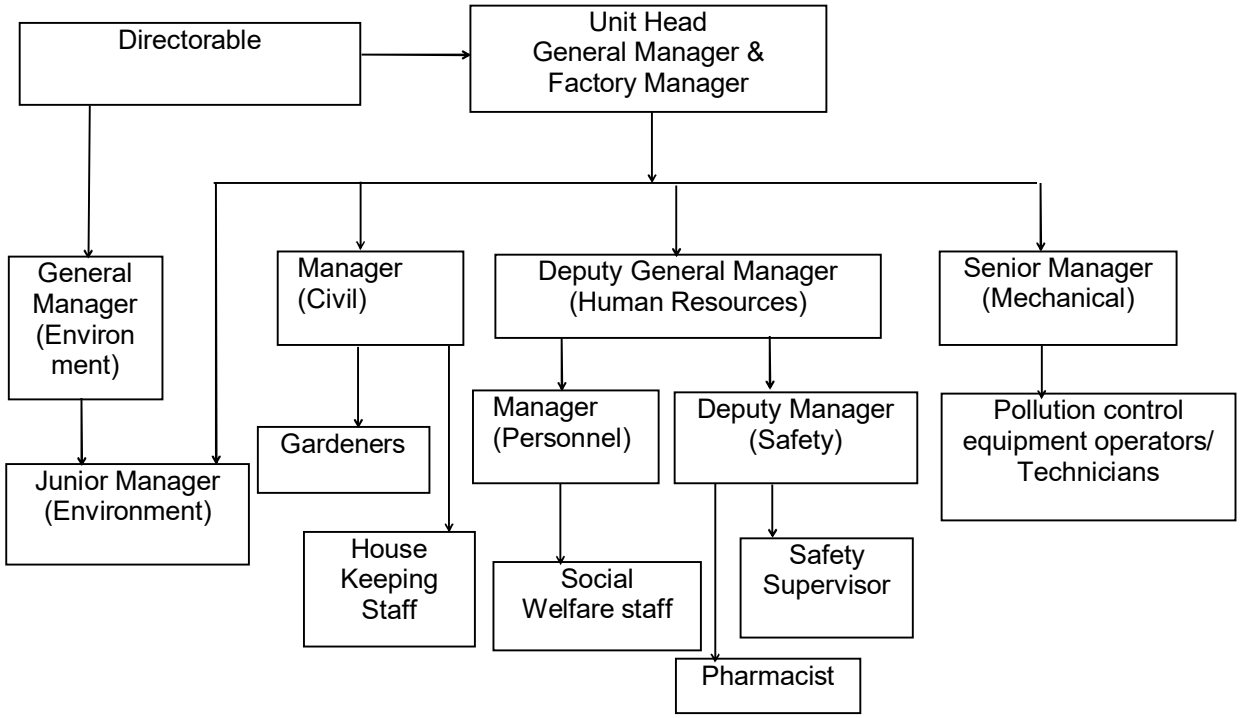
ENVIRONMENT MANAGEMENT PLAN

This chapter contains description of the various aspects of ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA. **Table 10.1** gives the monitoring parameters/ measurement methodologies, frequency, location and reporting schedules. Section 10.1 & 10.2 gives the structure and administrative responsibilities of EMP execution team. Section 10.4 gives the plan for implementation of CREP guidelines for the plant. Section 10.5 gives the Corporate Environmental Policy of the company along with the hierarchic system for to deal with the environmental issues and for ensuring compliance. The detailed capital cost for environment management plan is given in section 4.6, in **Table 10.3** and **Table 10.4** covers the recurring costs.

10.1 ORGANIZATIONAL SET-UP

Since this is an operational plant, an environmental management team is already in place to monitor and implement the environmental management programme. The same team shall be responsible for the plant after expansion. The organizational chart has been presented in **Fig 10.1.**

FIG 10.1: ORGANIZATIONAL CHART FOR ENVIRONMENTAL MANAGEMENT DURING OPERATION



The said team is/will be responsible for:

- Ensuring collection & testing of environmental samples of ambient air quality stack emissions, water/wastewater, soil, noise measurement etc. through accredited/ recognised laboratory.
- Implementing and monitoring the progress of implementation of the control measures, protection measures and mitigation measures related to air pollution management, wastewater management and solid waste disposal.
- Co-ordinating the environment related activities within the project as well as with outside agencies.
- Collecting statistics of health of workers and population of the surrounding villages.
- Green belt development, plantation schedule etc.

10.2 STRUCTURE AND ADMINISTRATIVE RESPONSIBILITIES OF EMP EXECUTION CELL

Rungta Mines Ltd. is an existing company having qualified and experienced personnel in environmental management and pollution control. The company has existing environmental monitoring cell at head office in Chaibasa for environmental monitoring and legal compliances. Cell for environment management in the proposed expansion project is present for the existing ferro alloys plant unit. The unit as shown in **Fig 10.1** will be functional for the expansion phase**.**

The overall responsibility of environment management will lie on **Unit Head** who is General Manager & Factory Manager. However, actual responsibility for execution of environmental mitigation measures will be of General Manager (Environment) and Senior Manager (Mechanical) and their subordinates. The responsibilities of various cadre are given below:

Deputy General Manager (Human Resources): This position is already existing in the plant. The same person will continue the functions. He will co-ordinate all the social activities such as finding out the social welfare needs of the nearby villages, collection of statistics of social requirements, budgeting the social needs, plan the activities as per CSR budget, approve the needs from management, execute the activities, look after its successful utilization through Manager (Personnel) and social welfare staff.

Deputy Manager (Safety): This position is already existing in the plant. The same person will continue the functions. He will develop, implement and monitor Occupational Health and Safety Policy, Programs and Procedures. He will also assist the management in complying with current health and safety legislation and/or regulations with the objective of ensuring that all reasonable and proper measures are to be taken to protect the safety and health of workers staff and visitors. He will also be overseeing the activities

of construction during expansion phase and ensure that the compliance to safety & health aspects are carried out.

General Manager (Environment): This position is already existing in the Company. The same person will continue the functions. He will be responsible for legal compliances of the plant related to MOEF&CC, CPCB & OSPCB. He will arrange regular monitoring of the proposed pollution control system. He will arrange evaluation environmental performance of the systems and ensure that the stipulated measures are being satisfactorily implemented and operated. He will ensure that there shall not be any adverse impact on air, water, noise and land environment due to construction & operation of proposed project. He will be assisted by a Junior Manager (Environment).

As per report of General Manager (Environment), the management shall take effective steps through the concerned section head to curb the pollution and effective environmental management.

He will also be overseeing the activities of construction during expansion phase and ensure that the compliance to environment aspects are carried out.

Manager (Civil) : This position is already existing in the plant. The same person will continue the functions. He will also be responsible for green belt development within the factory premises as well as within the study area in consultation with the horticulturists and house keeping department within the plant. He will also be overseeing the activities of construction during expansion phase and ensure that the compliance to environment, health and safety are carried out.

10.3 ENVIRONMENTAL MANAGEMENT PLAN WITH ADMINISTRATIVE ASPECTS

Proposed management measures for pollution control and environmental management for the proposed expansion are given in **Table 10.1**. The administrative roles of the personnel involved are detailed in Section 10.2.

TABLE 10.1: ENVIRONMENT MANAGEMENT MEASURES WITH ADMINISTRATIVE ASPECT

Discipline	Potential impacts and Source	Mitigation measures	Administrative Aspect		Monitoring Parameters
			Implementation	Monitoring	
During Construction Phase					
Topography	**Existing:** Change in topography due to construction of existing Ferro alloy plant and its related activities has already taken place. Additional units in the existing plant area will cause changes in the topography of existing plant area. **Proposed Expansion**: Change in topography due to construction in proposed expansion area and its related activities shall take place	The total project area after expansion will be 146.10 acres (Existing-52.525 acres and expansion- 93.575 acres). There shall be leveling of land by cutting as well as filing of soil taken out or required during construction of expansion facilities. Endeavour shall be there such that balance the digging & filling takes place so that no extra earth is left. As soon as the material is dug, it will be simultaneously utilised.	Civil contractor	Manager (Civil)	Measurement of material handling
Drainage	Disturbance to sheet flow, drainage and runoff	Runoff will be diverted through the man made storm water drainage system within plant to the surface water reservoir, which will act as a harvesting pond.	Civil Contractor	Manager (Civil)	Verification of construction of surface reservoir & storm water in drains
Water quality	➢ Suspended solids due to soil run-off	➢ During monsoon season run off from construction site will be routed to a	➢ Civil	General Manager	➢ Verification of desilting tank

Discipline	Potential impacts and Source	Mitigation measures	Administrative Aspect		Monitoring Parameters
			Implementation	Monitoring	
	during heavy precipitation. ➢ Loose soil at construction site. ➢ Domestic waste water (sewage) from workers in plant & residential areas	temporary sedimentation tank for settlement of suspended solids before release of water. ➢ Domestic waste water shall be treated in septic tank systems	Contractor	(Environment)	construction & operation. ➢ Water quality of raw water reservoir ➢ Checking of overflow from septic tanks, if any, to undertake it periodic cleaning
Air quality	Dust concentration due to construction activities, vehicular movement, excavation and material handling activities	➢ Isolating the construction area with flexible enclosures/ curtains so that the air emissions will not spread in the surroundings. ➢ Sprinkling of water in the construction area and unpaved roads. ➢ Periodic maintenance of vehicles shall be done and their PUC shall be ensured ➢ Trucks shall be covered with tarpaulin. ➢ Vehicles speed shall be restricted on construction roads and vehicles will use only dedicated construction roads and access points. ➢ Visually monitor particulate emissions	➢ Civil contractor	General Manager (Environment)	➢ Verifying construction of enclosures ➢ Verification of log of sprinkling & actual site conditions ➢ Verifying cover on trucks and construction of speed breakers ➢ Records of PUC of vehicles

Discipline	Potential impacts and Source	Mitigation measures	Administrative Aspect		Monitoring Parameters
			Implementation	Monitoring	
		from diesel vehicles			
Noise	Increase in noise level due to construction equipment.	➢ Equipment to be kept in maintained condition to keep the noise level within 90 dB(A). ➢ Develop and implement a construction noise management plan. ➢ Limit hours of construction where practical. Workers will be provided with necessary protective equipment e.g. earplug, earmuffs.	➢ Civil contractor	General Manager (Environment)	➢ Monitoring noise levels at site ➢ Verification of PPE of workers through surprise checks
Terrestrial ecology	Clearing of vegetation due to soil handling activities Removal of buildings falling under the footprint of construction	Landscaping and extensive plantation is being and shall be done as per green belt development plan. Transplantation of trees and compensatory plantation within and outside the building	➢ Civil contractor ➢ Horticulture staff	Manager (Civil)	➢ Verification by observation ➢ Records of plantation, transplantation ➢ Permission for tree cutting from competent authority
Excavated soil	Loss of excavated top soil Erosion during rainfall	➢ The top soil shall be temporarily stored in designated area and used in green belt and for leveling in the low lying area within areas to be constructed. ➢ Compactor or turfing of exposed soil to minimise erosion. ➢ Cover temporary soil storages wit	➢ Civil contractor ➢ Horticulture staff	Manager (Civil)	Verification by observation

Discipline	Potential impacts and Source	Mitigation measures	Administrative Aspect		Monitoring Parameters
			Implementation	Monitoring	
		tarpaulin			
Safety & Health	Accidents during construction	Precautions to avoid slip, fall, injury and install safety features such as hand rails, ropes, etc along with personal protective equipment	➢ Civil contractor	Deputy Manager (Safety)	Verification by observation
During Operational phase					
Air quality	➢ PM, SO_2 and NO_2 levels in ambient air due to stack emissions ➢ Fugitive dust emission due to material handling ➢ Emission due to traffic	➢ The list of pollution control equipment and measures for fugitive and stack emission in steel plant are summarised in section 4.4.2 & 4.4.3. ➢ The resultant air quality is and will conform to the stipulated standards. ➢ Bag Filters in ferro alloy plant are and will be installed to control particulates from furnaces, sinter plant & proposed chrome beneficiation plant. ESP in power plant shall be installed. ➢ Stacks heights as per norms are and will be provided for the proper dispersion of pollutants. ➢ Particulate emission from stacks is expected to be below 30 mg/Nm^3 ➢ Product stock yards will be covered ➢ Transport of raw material will be by road through covered trucks ➢ Green belt/ green cover development programs will be undertaken around	➢ Engineers & Staff of Maintenance departments of respective units ➢ Pollution control equipment operators/ technicians	➢ General Manager (Environment) ➢ Senior Manager (Mechanical) ➢ Unit Head	➢ Verification of records of online stack monitoring data ➢ Third party periodical ambient air quality monitoring for PM2.5, PM10, SO_2, NOx, etc ➢ Maintenance record of Bag Filters, ESP ➢ Verification of cover of trucks, dust suppression measures & plantation

Discipline	Potential impacts and Source	Mitigation measures	Administrative Aspect		Monitoring Parameters
			Implementation	Monitoring	
		the plant in the available area.			
Terrestrial ecology	➢ Impact on plant species due to emission from stack ➢ Planting trees within premises ➢ Impact on fauna and flora	➢ Control and disperse emission through Bag filters, ESPs and stacks of appropriate height. Air Ground level concentration to remain with permissible limits. ➢ Extensive tree plantation is and will be carried out and any tree cut will get compensated manifold ➢ Boundary wall shall be constructed around the expansion plant so that there is no interaction with the fauna of the surrounding except birds and small mammals who make their way into the planted areas of the plant. Boundary wall to be provided with weep holes to ensure runoff movement	➢ Horticulture staff	Manager (Civil)	➢ Inventory of trees planted with species and survival rate ➢ Area under plantation ➢ Height and girth to be annually measured, ➢ gap plantation to be carried out for mortality ➢ Inspection of boundary wall
Noise	Noise levels in the plant area due to equipment in main plant and auxiliaries.	➢ Equipment has been and will be designed to conform to noise levels prescribed by regulatory agencies where necessary, high noise generating equipment shall be acoustically treated or housed. ➢ Provision of green belt and plantation would further help in attenuating noise. Acoustic system for turbines will be provided. Noise attenuation	➢ Engineers & Staff of Maintenance departments of respective units ➢ Deputy Manager Safety	➢ General Manager (Environment) ➢ Unit Head	➢ Noise level ➢ Vibration level ➢ Tree inventory as in previous point ➢ Verification of PPE

Discipline	Potential impacts and Source	Mitigation measures	Administrative Aspect		Monitoring Parameters
			Implementation	Monitoring	
		measures are likely to keep noise level to 85 dB (A) at 1 m distance. ➢ Employees working in high noise areas will be provided with ear plugs/ear muffs as protective device. ➢ Maintenance of all equipment as per schedule			
Traffic impacts	➢ Impact on infrastructure (road maintenance, carrying capacity) ➢ impact on air quality and noise due to vehicular movement	➢ Provision of the proper parking yard ➢ maintenance of roads and transportation vehicles. ➢ Use of covered trucks for transportation of raw and finished products to make spill-proof. ➢ Movement in non peak hours, if required, considering the existing traffic volume and pattern	Manager (Civil)	Unit Head	Verification by observation
Demography and socio-economics	➢ During the construction phase, no family will be displaced from the core zone as there are no habitation in the expansion project land and, thus, no resettlement is involved in the area.	➢ Direct purchase of land from private land owners is envisaged with amicable compensation ➢ Plant is being and will generate direct employment. The preference has been and will be given to local population and land loosers for employment in the semi-skilled and unskilled category. ➢ Indirect employment is being and will be created by the plant for supply of	Manager (Personnel)	Deputy General Manager (Human Resources)	➢ Registration of purchased land ➢ Employment and domicile records ➢ CSR compliances

Discipline	Potential impacts and Source	Mitigation measures	Administrative Aspect		Monitoring Parameters
			Implementation	Monitoring	
	➢ Land losers will be there from the private land that has to be purchased by the company ➢ There will be influx of operating personnel. Hence, demographic profile may undergo some changes.	daily domestic goods. Additional facilities are and will be developed by the project proponent in surrounding villages as part of CSR.			
Green belt	Green belt will have positive impact by acting as air pollutant sink and absorbing noise pollution from plant operation	➢ Green belt is provided in existing plant and will be provided all along the periphery of the expansion area and vacant areas in the plant, along roads, between Lingara Nadi and facilities, etc. Part of the treated waste water from the plant will be used for greenbelt development. ➢ Green belt will also act as carbon sink	Horticulture staff	Manager (Civil)	➢ Verification by observation ➢ Waste water reuse log books
Fire and Safety	Accidents/ disasters related to fire and safety	➢ Prepare and implement Disaster Management Plan (DMP). ➢ A well-laid fire fighting system and fire extinguishers are and will be installed as per fire safety norms. ➢ Regular fire safety training and mock drills are and will be conducted.	Deputy Manager (Safety)	Unit Head	➢ Verification of approvals from factory inspector ➢ Fire fighting approvals ➢ Training and mock drill records

Discipline	Potential impacts and Source	Mitigation measures	Administrative Aspect		Monitoring Parameters
			Implementation	Monitoring	
Solid Waste	➢ Pollution of air due to waste handling ➢ Solid wastes from processes require management ➢ Municipal solid waste due to everyday sweeping, canteen and domestic activities ➢ Sludge from sewage treatment systems ➢ Miscellaneous wastes from plant	➢ Organic component of municipal solid waste due to everyday sweeping, canteen and worker activities is being and will be composed and used as manure. Recyclable waste is being and shall be sold to recyclable vendor. ➢ The sludge from sewage treatment systems shall be composted and used as manure horticulture. ➢ Management of other wastes from the ferro alloy plant and power plant has been discussed in detail in chapter 4, section 4.7.2	➢ Manager (Civil) ➢ Deputy Managers of Raw Material Handling System, Sinter and assistant manager (Production) ➢ Junior Manager (Environment)	Unit head	➢ Log of solid waste handling, reuse and disposal ➢ Inspection of solid waste storage site ➢ Log books of STP ➢ Surprise checks ➢ Verification by observation
Liquid Effluent	Pollution of surface and ground water, propagation of vectors, creation of odour due to effluents from sewage treatment systems, reject water from demineralisation system, jigging water, beneficiation tailimg water, etc.	➢ DM Plant regeneration waste water after passing through neutralization pit shall be used for irrigation of green belt and horticulture. ➢ Treated waste water from sewage treatment systems will be used for irrigation of green belt in plant area. ➢ Waste water from blowdowns of various cooling systems will be collected in common basin, neutralised if required and reused in sprinkling, watering, irrigation of	Effluent Treatment Unit operators	➢ General Manager (Environment) ➢ Senior Manager (Mechanical)	➢ Quality parameters ➢ Log books ➢ Periodic Inspection to ensure efficient operation of common basin, sewage treatment system(s), jigging water tank & pumps, tailing tank & pumps,

Discipline	Potential impacts and Source	Mitigation measures	Administrative Aspect		Monitoring Parameters
			Implementation	Monitoring	
		green belt and horticulture, etc. ➢ Jigging waste water of the metal recovery plant will be collected in a tank at the sub-unit itself and re-circulated back for washery in the jigging plant ➢ Chrome beneficiation tailing will be dewatered in tailing tank and filter press. Thereafter, recovered water will be recirculated to the beneficiation process			filter press & water pumps
Health and Safety	Injury Occupational disease	➢ Working as per approved plans. ➢ Periodical Medical Examination. ➢ Extensive publicity and propaganda related to safety.	Deputy Manager (Safety)	Deputy General Manager (Human Resources)	➢ Medical Examination Records as given in **Annexure XXVI** ➢ Training records ➢ OHS records

10.4 PLAN FOR IMPLEMENTATION OF CREP GUIDELINES FOR STEEL PLANT

The corporate responsibility for environmental protection (CREP) guidelines are available for steel plant while the proposed project is a ferro alloys plant. Considering that separate CREP guidelines are not available for ferro alloys plant, steel plant guidelines have been considered. The plan for implementation of the same for Expansion of Ferro Alloys Plant is given in **Table 10.2**.

TABLE 10.2: PLAN FOR IMPLEMENTATION OF RECOMMENDATIONS MENTIONED IN CHARTER ON CORPORATE RESPONSIBILITY FOR ENVIRONMENTAL PROTECTION (CREP) FOR STEEL INDUSTRY

Sl. No.	Recommendation	Action taken
1	***Coke Oven Plants*** • To meet the parameters PLD (% leaking doors), PLL (%leaking lids), PLO (% leaking off take), of the notified standards under EPA within three years (by December 2005). Industry will submit time bound action plan and PERT Chart along with the Bank Guarantee for the implementation of the same. • To rebuild at least 40% of the coke oven batteries* in next 10 years (by December 2012).	Not applicable since no coke oven plant is existing or proposed in the ferro-alloys plant.
2	***Steel melting shop*** To reduce 30% fugitive emissions by March 2004 and 100% by March 2008 (including installations of secondary dedusting facilities)	Not applicable as no steel melting shop is existing or proposed
3	**Blast Furnace** Direct inject of reducing agents 55% by June 2013.	Not applicable since no blast furnace is existing or proposed
4	**Solid waste/ Hazardous Waste management** Utilisation of Steel Melting Shop (SMS)/ Blast Furnace (BF) Slag as per the following schedule: By 2004 – 70% By 2006 – 80% By 2007 – 100%	No last furnace slag or SMS slag will be there. However, there will be ferro alloys slags, which will be utilised as follows: • Ferro Manganese slag - 47% directly reuseable for Fe-Si manufacturing in house and balance sold to other manufacturers • Silico-Manganese slag will be sent to metal recovery plant for Manganese recovery(~5%), balance (95%) used as construction sand.

Sl. No.	Recommendation	Action taken
		• Ferro silicon slag will be sold and is useable in cupola furnace. • Ferro Chrome Slag - will be sent for Chrome recovery (~5%) through Chrome Beneficiation Plant. After TCLP test on remaining material (~95%), it will be used as landfill/ base material in roads (when Cr within permissible limits), else sent to the nearest TSDF facility. Fe-Cr slag is also reusable for 100% sold, reusable for making in refractory castables in non-recovery coke oven batteries, coal-fired power boilers, industry furnaces, etc • Pig Iron slag - 100% sent to metal recovery plant for Fe recovery (~5%), balance (95%) used as construction sand
5	**Water conservation/ water pollution** To reduce specific water consumption to 5 m^3/t for long products and 8 m^3/t for flat products by December 2005. To operate CO-BP effluent treatment plant efficiently to achieve the notified effluent discharge standards- by July 2003.	The specific water requirement for production of ferro alloy will be 5 KL/ T for maximum production of pig iron, which also has the maximum water consumption. This includes the water requirement for power plant, . The plant works on zero discharge principle and all the treated effluent is and will be re-circulated and re-used in the plant.
6	Installation of Continuous Stack Monitoring system and its calibration in major stacks and setting up of the online ambient air quality monitoring stations by June 2005.	Online Ambient Air Quality monitoring systems will be installed at 1 location within the project boundary for PM_{10}, $PM_{2.5}$, SO_2 & NOx & online data connected through the Real Time Data Transmission to State Pollution Control Board as well as Central Pollution Control Board, New Delhi. Online stack monitoring system will be provided on the bag filter stacks connected to the submerged arc furnaces and online system will be connected to OSPCB and CPCB Online servers.

Sl. No.	Recommendation	Action taken
7	To operate the existing pollution control equipment efficiently and to keep proper record of run hours, failure time and efficiency with immediate effect. Compliance report in this regard be submitted to CPCB/SPCB.	It is an existing plant going for proposed expansion. The pollution control devices are and will be installed and efficient operation and regular record is being and will be maintained. The records are being and will be submitted to the SPCB/ MOEF&CC, New Delhi when required.
8	To implement the recommendations of Life Cycle Assessment (LCA) study sponsored by MoEF by December 2003.	The recommendations of MoEF&CC shall be implemented on complete installation of all the plant facilities of expansion phase.
9	The industry will initiate the steps to adopt the following clean technologies / measures to improve the performance of industry towards production, energy and environment:	
	➢ Energy recovery of top Blast Furnace (BF) gas.	Not applicable since no blast furnace is existing nor proposed.
	➢ Use of Tar-free runner linings.	No tar shall be used in manufacturing process or collection of metal or slag
	➢ De-dusting of Cast House at tap holes, runners, skimmers, ladle and charging points.	Hoods are being and shall be provided above tap hole as well as charging area connected to the fume extraction system leading to bag filter.
	➢ Suppression of fugitive emissions using nitrogen gas or other inert gas.	Not applicable since the main dust gets generated at the time of charging and operation from the submerged arc furnace. The dust is being and shall be captured via top hood connected to fume extraction system and bag filter.
	➢ To study the possibility of slag and fly ash transportation back to the abandoned mines, to fill up the cavities through empty railway wagons while they return back to the mines and its implementation.	Fly ash generated from CPP will be utilized in brick manufacturing. The slags from the ferro alloys plant have economic value and is being and will be reutilised inhouse as well as sold to other ferro alloys plants/ cupola furnace for reuse or sold to jigging or slag recovery units for recovery of metal as described in point 4 of this table earlier.
	➢ Processing of the waste containing flux & ferrous wastes through waste	As described in point 4 of this table earlier.

Sl. No.	Recommendation	Action taken
	recycling plant.	
	➢ To implement rainwater harvesting.	Rainwater harvesting is being implemented in the existing plant and will be implemented for the proposed expansion phase also.
	➢ Reduction Green House Gases by: 1. Reduction in power consumption 2. Use of byproducts gases for power generation 3. Promotion of Energy optimization technology including energy / audit	1. The power consumption will be reduced through energy conservation measures, use of solar power generated inhouse from roof top, use of better quality raw material and minimization of energy loss with slag. 2. Not applicable as no product gases are viable for power generation 3. Energy auditing will be carried out periodically
	➢ Up-gradation in the monitoring and analysis facilities for air and water pollutants. Also to impart elaborate training to the manpower so that realistic data is obtained in the environmental monitoring laboratories.	The plant has setup a team for Environmental Management who is being and will be given training related to sample collection and analysis for ambient air quality, water quality, noise monitoring and stack monitoring. However, environmental monitoring for various parameters will be carried out by NABL/ MOEF&CC accredited Laboratory.
	➢ To improve overall housekeeping.	Good housekeeping is being carried out in existing plant and will be carried out after expansion also.
10	**Sponge Iron Plant:** Inventorisation of Sponge Iron Plants to be completed by SPCBs/CPCB by June 2003 and units will be asked to install proper air pollution control equipment by December 2003 to control primary and secondary emissions.	Not applicable as this is ferro-alloy plant.

10.5 CORPORATE ENVIRONMENT POLICY

The Company has formulated Environment Policy duly approved by Director dated 10.01.2023, copy of which is given in **Fig 10.2.**

FIG 10.2: ENVIRONMENTAL POLICY OF THE COMPANY

Rungta Mines Limited
(FERRO ALLOYS DIVISION)
Works : Vill :- Tulasidiha, P.O. :- Meramandali, Dist. :- Dhenkanal - 759121, ODISHA, INDIA
Phone : (06732) 258171, Fax : (06732) 258171 Email : fad@rungtamines.co.in

10.01.2023

ENVIRONMENTAL POLICY
OF
RUNGTA MINES LIMITED (FERRO ALLOYS DIVISION)

Ferro Alloys Division of **M/s Rungta Mines Limited** located at village Tulasidiha in the Dhenkanal district of Odisha aspires to become a globally admired organisation that enhances the quality of life through sustainable development with great care for the environment and needs of the society. It is also committed to protect and improve the environment and abide by the laws & regulations concerning the environment.

The Company has laid down Environmental Policy duly approved by the Board of Directors in their meeting held on 19.12.2022. The Environmental Policy of the Company prescribes for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental/ forest/wildlife norms or conditions or of stakeholders. The copy of the board resolution along with Half- Yearly Report in this regard shall be submitted to the MoEF & CC.

Our plant is committed:

- To work towards Environment Protection, Prevention of environmental pollution, and Improvement of Environment around the units.
- To adopt sound Environmental Management practices to achieve sustainable growth.
- To comply with all applicable statutory and other norms/requirements which shall include prevention of pollution of surrounding habitation by continuous monitoring and adopting suitable measures for environmental protection.
- To implement systems to deal with environmental issues, ensuring compliance and reporting.
- To evaluate effectiveness of system through management reviews.
- To create environmental awareness among the employees and the local communities through pro-active training and communication.

For Rungta Mines Limited
(Ferro alloys Division)

(PRADEEP KUMAR CHATURVEDI)
Director
DIN- 08978079

Place: Dhenkanal

Registered Office : 8A, Express Tower, 42A Shakespere Sarani, Kolkata - 700 017, WEST BENGAL, INDIA
Phone : (033) 22816580, Fax : 91-33-22815380, CIN-U26911WB1962PLC025691
Email : rungta_cal@rungtamines.com

Since the plant is operational, specific activities in the project, functions and role of the employees have already been defined as discussed in sections 10.1 and 10.2 earlier.

The existing ferro alloys plant also has ISO 9001, ISO 14001 and ISO 45001 certification as seen in **Fig 10.3**, which has aided in developing a robust environmental compliance system at corporate level.

FIG 10.3: CERTIFICATION OF ISO 9001, ISO 14001 AND ISO 45001



Standard operating process / procedures to address deviation/ non-compliance/ violation

A Manual including environment and safety points has been is prepared as part of the Integrated Management System comprising of ISO 9001, ISO 14001 and ISO 45001 and has been implemented. The Manual has been prepared to comply to the Environment, Health and Safety Policy covering the following aspects:

1) Environment clearance conditions/ stipulations/ norms
2) Consent to establish conditions / stipulations / norms
3) Consent to Operate/ Consolidated Consent & Authorization conditions/ stipulations/ norms
4) Monitoring mechanism for compliance through periodic audits
5) Reporting of the audit results to Board of Directors
6) Corrective and Preventive Actions to be taken
7) Self improvement measures

Hierarchical systems to deal with the environmental issues and for ensuring compliance

The Company has established an environmental management team which is responsible for the compliance of CTO in present phase and will be responsible for Environmental Conditions after expansion of the plant.

Furthermore, Environmental Manual has been prepared and defines the roles and responsibilities of various members of the team in different hierarchical levels with respect to adherence to the Environmental policy and compliance with Environmental Laws and Regulations.

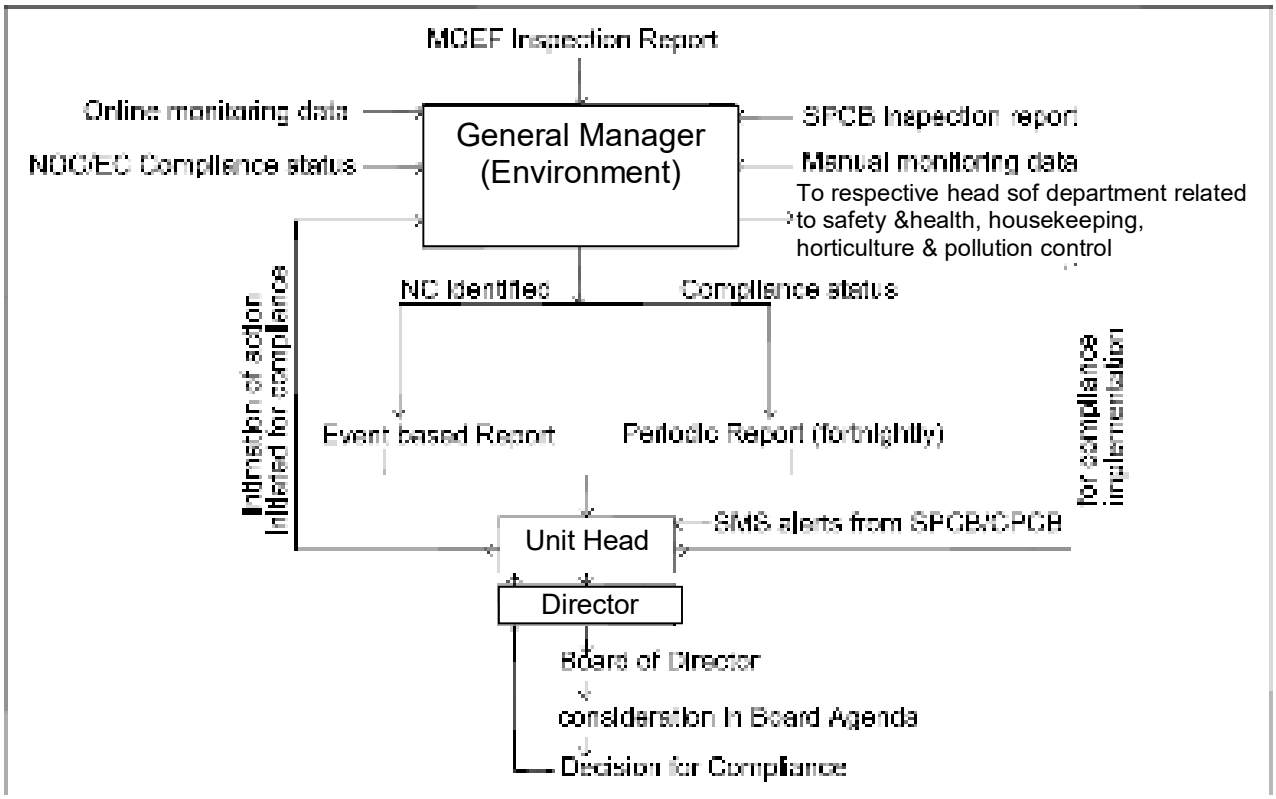
Systems of reporting of non compliances/ violations

Plant is operating with ferro alloys capacity of 0.055 MTPA, metal recovery of 0.0198 MTPA and Sinter Plant of 0.0432 MTPA since 2007. The ferro alloys plant has been operating under Consent to Operate (CTO) from Odisha State Pollution Control Board (refer **Annexure XXI)**. Compliances to CTO (Refer **Annexure XXII**) is being submitted regularly to the State Pollution Control Board for the existing operational capacity. Deviations from the policy and cases of violation of Consent to Operate as found by OSPCB or other public authority will be reported to Board of Directors and corrective as well as preventive action will be taken. The system of reporting non compliances/ violations is summarised below:

Inputs	• Perusal of data from online monitoring systems attached to stacks • Continuous ambient air quality stations • SMS alerts from SPCB/ CPCB • NOC/ CCA conditions compliance status • Periodic manual monitoring data • Inspection report of CPCB • Inspection report of SPCB • Complaints from local people, NGO or any other, if any • Environmental statement (Form V)
Hierarchy of reporting upwards	Junior Manager (Environment) → General Manager (Environment) → Unit Head→ Director → Board of Directors
Type of reporting	1. Periodic written report, every month is submitted even when all conditions are complied 2. Event based written reporting whenever any of the inputs reveals non-compliance
Frequency of consideration by Board	Board of Director meets regularly and considers the reports received as one of the agenda items. It is to be recorded in minutes of meeting. In case of non-compliance, a decision for its resolution is to be taken and communicated down the line to the person executing the compliance. The Environmental Statement (Form V) is to be considered annually and recorded in the Annual report.
Hierarchy of downward implementation	Board of Directors → Director → Unit Head → to relevant department head/ staff or horticulture department or housekeeping or mechanical department or pollution control devices operator or effluent treatment unit operator or any other relevant staff with intimation to General Manager (Environment).

Flow chart of the system of reporting of non compliances or violations has been shown in **Fig 10.4**.

FIG 10.4: FLOW CHART OF THE SYSTEM OF REPORTING OF NON COMPLIANCES



10.6 BUDGETARY PROVISION FOR ENVIRONMENTAL MANAGEMENT

A. Capital cost estimated for EMP

Adequate budgetary provisions have been made by the Company for execution of Environmental Management Plan. **Table 10.3** give overall investment on the environmental safeguards and recurring expenditure for successful monitoring and implementation of control measures.

Assumptions for cost calculation:

- Manpower considered :

Grade	Designation	Utilisation in EMP related activities	Number of persons	No. Of shifts
Gr-I	Unit Head	5%	1	1
Gr-II	General Manager (Environment)	10%	1	1
	Manager (Civil)	10%	1	1
	Deputy General Manager (Human Resources)	5%	1	1
	Senior Manager (Mechanical)	15%	1	1
Gr-III	Junior Manager (Environment)	100%	1	1
	Manager (Personnel)	10%	1	1
	Deputy Manager (Safety)	100%	1	1
	Pharmacist	100%	1	1

Grade	Designation	Utilisation in EMP related activities	Number of persons	No. Of shifts
Gr-IV	Pollution control equipment operators/ Technicians	20%	10	3
	Gardener	100%	10	1
	House Keeping Staff	100%	10	3
	Social Welfare staff	100%	1	1
	Safety Supervisor	100%	1	3

- Life of projects – 30 years
- Annual salary of Class I assumed as Rs. 250,000 pm, Class II assumed as Rs. 75,000 pm, Class III assumed as Rs. 40,000 pm, Class IV assumed as Rs. 12,000 pm
- Unit cost of electricity (Rs./kWh)- Rs. 2.73 (self generation), diesel Rs. 95.41/ litre, Petrol Rs. 103.87/ litre
- Number of shifts are three with annual 350 working days
- Debt: Equity ratio -zero since the plant will be self funded.

Capital cost estimated for EMP is given in **Table 10.3**.

TABLE 10.3: CAPITAL COST FOR ENVIRONMENT MANAGEMENT (ALL FIGURES IN RS. LAKHS)

Sl. No.	Particulars	Existing 0.055 MTPA Ferro Alloys Plant			Proposed Additional 0.238 MTPA Ferro Alloys Plant			Total for 0.293 MTPA Ferro alloys Plant	
		No. of eqpt.	Unit cost	Capital cost	No. of eqpt.	Unit cost	Capital cost	No. of eqpt.	Capital cost
1	**AIR POLLUTION CONTROL**								
1.1	Fume Extract System with Bag filter (SAF 9 MVA)	1	50	50	7	150	1150	8	1200
1.2	Fume Extract System with Bag filter (SAF 18 MVA)	1	75	75	3	225	825	4	900
1.3	Bag filters (sinter plant 150 TPD)	1	20	20	0	20	0	1	20
1.4	Bag filters (sinter plant 3 X 600 TPD)				3	70	210	3	210
1.5	Bag filters (chrome beneficiation)				4	20	80	4	80
1.6	ESP (power plant)				7	150	1050	7	1050
1.7	Dry fog/ dust supression system	LS	4	4	LS	20	16	LS	20
1.8	Industrial mechanised sweeper				LS	20	20	LS	20
1.9	Water sprayer (Mobile)	1	15	15	1	15	15	2	30
	Total (air pollution control)			**164**			**3366**		**3530**
2	**WATER POLLUTION CONTROL**								
2.1	Sewage treatment plant- installation proposed (Septic tank in existing)	1	4	4	0	20	16	1	20
2.2	Sewage treatment plant- chemical consumption				1	6	0	1	
2.3	Power plant- neutralisation tank				1	6	6	1	6
2.4	Chrome beneficiation- tailing				2	3	6	2	6

Sl. No.	Particulars	Existing 0.055 MTPA Ferro Alloys Plant			Proposed Additional 0.238 MTPA Ferro Alloys Plant			Total for 0.293 MTPA Ferro alloys Plant	
		No. of eqpt.	Unit cost	Capital cost	No. of eqpt.	Unit cost	Capital cost	No. of eqpt.	Capital cost
	tank								
2.5	Others- common basin				1	2.5	2.5	1	2.5
2.6	interceptor/ Garland drains, retaining wall, check dams, weep holes	LS	1	1	LS	5	4	LS	5
2.7	Storm water drains (@1800 Rs/m)	2000	0.018	36	5300	0.018	95.4	7300	131.4
2.8	Desilting chamber before water reservoir				LS	5	5	LS	5
	Total (water pollution control)			**41**			**134.9**		**175.9**
3	**NOISE POLLUTION CONTROL**								
3.1	Acoustics	LS	4	4	LS	20	16	LS	20
3.2	Preventive maintenance	LS	0.2		LS	1	In recurring	LS	In recurring
	Total (noise pollution control)			**4**			**16**		**20**
4	**ENVIRONMENT MONITORING**								
4.1	Air pollution monitoring	#		12	#		229.65	#	**241.65**
4.2	Water pollution monitoring	#			#		1.25	#	1.25
4.3	Noise pollution monitoring	#			#		0.5	#	0.5
	TOTAL (Environment monitoring & management)			**12**			**231.4**		**243.4**
5	**OCCUPATIONAL HEALTH**								
5.1	Fire fighting equipment (Portable)	10	0.1	1	40	0.1	4	50	5
5.2	Fire fighting equipment (Fixed)	1	5	5	0	25	20	1	25
5.3	Health Checkup (Induction)	500	0.03	15	1500	0.03	45	2000	60
5.4	Health Checkup (during service, once in 5 years)	100	0.03	In recurring	300	0.03	In recurring	400	In recurring
5.5	PPE	550	0.01	In recurring	1650	0.01	In recurring	2200	In recurring
	TOTAL (occupational health)			**21**			**69**		**90**
6	**GREEN BELT (Ha)**								
6.1	Initial Plantation, Ha	7.082	1.25	8.85	12.497	1.25	15.62	19.579	24.47
6.2	Maintenance, Ha	7.082	0.25	In recurring	12.497	0.25	In recurring	19.579	In recurring
	TOTAL			**8.85**			**15.62**		**24.47**
7	**OTHERS**								
7.1	Preparation of various studiest + ISO 14000	LS	0.5	In recurring	LS	2.5	In recurring	LS	In recurring
7.1	Solid waste management	LS	2.4	2.4	LS	12	9.6	LS	12
	TOTAL			**2.4**			**9.6**		**12**
	GRAND TOTAL (EMP)			**253.25**			**3842.52**		**4095.77**

Annual recurring cost of monitoring and implementation of control measures and environment management plan, which includes the cost of electricity, diesel, manpower, depreciation, interest, R&M and others is given in **Table 10.4**.

TABLE 10.4: RECURRING ANNUAL COST FOR ENVIRONMENT MANAGEMENT (RS. LAKHS)

Sl. No.	Particulars	Existing 0.055 MTPA Ferro Alloys Plant	Proposed Additional 0.238 MTPA Ferro Alloys Plant	Total for 0.293 MTPA Ferro alloys Plant
1	Air Pollution Control	275.45	1523.53	1798.98
2	Water Pollution Control	4.19	12.90	17.08
3	Noise Pollution Control	0.33	1.33	1.67
4	Environmental Monitoring	4.73	74.52	79.25
5	Occupational Health	23.27	26.46	49.73
6	Green Belt	9.16	13.85	23.01
7	Others	4.23	2.32	6.55
8	Overheads (3% of Dep., Energy, R&M & Interest)	6.36	37.23	43.59
	Total	**327.71**	**1692.14**	**2019.85**

The additional capital investment on environmental management plan for expansion phase is envisaged as Rs. 3842.52 lakhs and recurring expenditure will be Rs. 1692.14 lakhs/year.

CHAPTER 11

SUMMARY & CONCLUSION

11.1 INTRODUCTION

11.1.1 General background

Rungta Mines Ltd. has been working in the mining business since the last 6 decades and has established several steel & power plant in Odisha and Jharkhand.

Rungta Mines Ltd. is operating a ferro alloys division in village Tulasidiha in District Dhenkanal of Odisha. It has a capacity of 55,008 tonnes per annum ferro alloys (ferro manganese 55,008 tonnes per annum or silico manganese 39,960 tonnes per annum) and sinter plant (manganese) of 43,200 tonnes per annum. It is operating based on the Consent to Establish received from Odisha State Pollution Control Board.

The company now proposes to expand the ferro alloys division. The expansion shall be carried out by enhancing the capacity of ferro alloys production from 55,008 to 293,376 tonnes per annum and addition of two more ferro alloy products, namely, ferro chrome and ferro silicon. There shall also be enhancement of metal recovery plant from 19,980 to 115,400 tonnes per annum and sinter plant from 43,200 to 561,600 tonnes per annum. There shall be addition of pig iron (369,600 tonnes per annum), briquette plant for ferro chrome (461,127 tonnes per annum), briquette plant for ferro manganese (586,754 tonnes per annum), chrome ore beneficiation (660,000 tonnes per annum) and power plant (150 megawatt). There shall be expansion of land from 21.257 to 59.126 hectare. The expected cost of the project expansion is proposed as Rs. 950 Crores

11.1.2 Location and communication

The existing plant is located in village Tulasidiha. For proposed expansion phase, land of two additional villages Chararhagarhia and Kangelapal shall be added. These villages are in District Dhenkanal, Odisha. Location map is shown in **Fig 1.1 of chapter 1.** The coordinates of the plant area based on Google Earth is as follows:

Latitude : 20° 47' 14.93" to 20° 47' 52.48"N
Longitude : 85° 17' 14.82" to 85° 17' 51.21"E

The plant is accessible by all-weather road from the collector office in Angul, which is 20.7 km in west north west direction. District headquarter

Dhenkanal is 34.6 km. The site is located 0.85 km from NH-55, which connects Bhubaneswar to Angul. The nearest railway station is Meramandali at a distance of 1.1 km in North. The nearest airport is at Bhubaneswar, which is 79 km in south east.

11.2 PROJECT DESCRIPTION

11.2.1 Plant layout

The total plot area after expansion shall be 59.126 hectares. Layout of plant can be seen in **Fig 2.1 of Chapter 2**. After construction of project, it shall comprise of Plants, facilities & tailing management (28.496 hectares), Stock yards (2.428 hectares), Area for solid waste management (2.631 hectares), Green belt & plantation (19.579 hectares), Administration buildings (0.607 hectares), Water reservoir (2.444 hectares) and roads (2.941 hectares).

11.2.2 Process Description

Submerged arc furnaces produce a wide range of metal products by smelting various minerals to metal products. In the submerged arc furnace, electric power heats the raw materials and provides the energy to reduce the ore to a metallic state. The term “Submerged Arc” is used because the electrodes are usually buried deep in the furnace burden. Generally, carbon serves as the reducing agent and fluxes are often added to facilitate the process. The common practice is to mix the ore materials, the reducing agent, and any fluxes outside of the furnace and then to periodically charge this mixture (often called charge mix) into the furnace. Charge mix is added periodically but the reduction reactions and metal production occur continuously. The metal is usually allowed to accumulate and removed at appropriate intervals into ladles or casting pans or sand pits. The slag containing impurities is removed.

The products to be made in this plant will be as follows:

Ferro Manganese: Manganese ores, which usually contain iron oxide, are mixed with coal or coke reductant and usually a small quantity of fluxes to form the charge mix. The charge is smelted and the slag is removed first before removing ferro manganese. The slag and ferro manganese are removed in sand pits, solidified and then cooled for further processing. Ferro Manganese slag has utility as raw material in silico manganese manufacturing.

Silico manganese production: Silico manganese is made in submerged arc furnace. It is done by heating a mixture of Manganese Ore, iron oxides, quartz (for silicon), dolomite, coal, ferro manganese slag and charcoal/ coke (for carbon). These are melted simultaneously and reduced reaction takes place. The process is carried out continuously. Charging is done from the top and removal of slag and molten metal takes place from bottom.

Ferro Chrome production: raw material such as chrome briquettes, chrome ore lumps, coke and quarts are heated and smelted. The heating of the input charge by the heat of burning gases leaving the furnace removes volatiles and moisture also. Melting and reduction of iron and chromium with simultaneous formation of chromium and iron carbides takes place. This is followed by the formation of the molten ferro chrome which further removed and cooled. Slag formed is also removed.

Ferro silicon production: It is manufactured by smelting iron oxides, quartz, dolomite and charcoal/ coke. Ferro silicon smelting is essentially a slag-less process. Still some slag formation takes place because of the presence of impurities in raw materials.

Pig Iron: It is manufactured by smelting iron oxides (ore/ sinter/ mill scale, etc.), metallurgical/ pearl coke, quartz, flourspar, dolomite/ limestone and coal. The process of pig iron manufacturing will also create slag.

Metal Recovery Plant: The ferroalloy slags consist of some portion of valuable ferroalloy materials also. These can be recovered from the slag in a condition that can be directly sold or reused. Thus, a metal recovery plant is being used to recover this portion of metal from slag and it shall be enhanced for expansion phase.

Briquette Plant for ferro chrome and for ferro manganese: The briquette plants will use the fines and concentrates purchased or received from in house metal recovery, ore beneficiation plants or bag filter to create briquettes. The briquettes bring the fines in a usable form which can fed into the submerged arc furnace.

Sinter Plant: The sintering process is the process of agglomeration of fine particles of manganese ores, manganese oxide wastes, coke fines and fines from material handling and bag filter by heating. The process is carried out in three stages. Raw material is handled and preparation of Green Mix is carried out. Sintering of Green Mix produces sinter cakes. Crushing of sinter cakes is done to produce desired size suitable to use in furnace.

Chrome Ore Beneficiation: The plant will beneficiate the low grade chromite ore fines received from mines. Sizing in jaw crusher shall take place. The crushed material from jaw crusher will be fed into roll crusher. It will then be separated in double deck vibrating screens. The separated material will be conveyed to wet vibrating screen through belt conveyor. Primary separation of SiO_2, MgO, Al_2O_3 and other floating material will occur in hydro-cyclones and goes to tailing along with water. The gravity separation occurs in spiral bank to achieve better quality chromium.

Power plant: 150 megawatt AFBC/CFBC based power plant has been proposed. It will operate on coal. The power generated from the CPP will meet the requirement of the Ferro Alloys Plant.

11.2.3 Raw material, power and water

Raw Material: The raw material requirement would be fulfilled by in-house intermediate products and open market. The out-house raw material and fuel requirement for the project will go upto 3,432,200 tonnes per annum. Fuel & raw materials consumption will be mainly iron ore fines, coke fines, lime stone, dolomite, quartz, charcoal / coke, manganese ore, low-grade high silicon MOIL ore, coal, chrome ore lump, manganese ore concentrate, molasses, chome-ore concentrate and low grade chrome ore. The transportation shall be done by road and rail/road combination.

Power: Total power requirement for existing and proposed expansion shall be 150 megawatt. This will be met through proposed 150 megawatt captive power plant.

Water: The total fresh water requirement for the entire project will be 237 kilo litres per hour. The water required for the plant shall be sourced from Lingara nadi or Brahmani river for industrial use and ground water for domestic use. Water shall also be collected through rainwater harvesting also for use within plant.

11.2.4 Manpower

The existing manpower is 500 and additional manpower requirement will be 1500. Employment shall be required for various activities like operation, supervision, maintenance, loading, unloading, handling, transportation, housekeeping, horticulture, security and other miscellaneous works inside the plant. Unskilled and semi-skilled manpower will be sourced from the local villages. Some skilled manpower may be required from other parts of the state and country. Three shifts working is planned. Number of working days shall be increased from 325 to 350 days per annum.

11.2.5 Site services

Infrastructure like canteen, rest room, first aid centre, vehicle parking, cycle stand, drinking water, sanitation facilities, etc. are existing. They shall be enhanced for the expansion phase. These will be used for workers & drivers during operation phase. No residential facilities are envisaged for the employees. Temporary sheds for workers will be established at the site during construction phase only.

11.3 PRESENT ENVIRONMENTAL SCENARIO

For the description of baseline environmental scenario, the plant area has been considered as the “core zone”. The area falling within a distance of 10 km from the boundary of the core zone has been considered as the “buffer zone”. Together they comprise the study area which can be seen **Fig 3.2 of Chapter 3**.

11.3.1 Topography and drainage

Core zone: The core zone represents nearly flat land having elevation from 61 m – 73 m amsl, as per google earth of the existing and expansion plant area.

Buffer zone: The study area (10 km radius around project) is sloping from the southern side towards Brahmani river in the north east. There are few hills in the southern portion with a maximum elevation of 312 m above mean sea level (amsl) at Nimidha RF. The lowest elevation of around 56 m amsl near Rorha is observed in study area. Open scrub patches are scattered in the buffer area. Most of the buffer area is agricultural private land with a few large industries.

The drainage of the study area is controlled mainly by the Brahmani river flowing 3.8 km north east of the project. Its tributaries are Nigra or Lingara Nadi (adjoining to plant), Kisinda Jor (2.1, N), Kusumdor Jor (7.0, SSE) and Ria Jor (5.9, NE). These form the main drainage in the study area with seasonal surface flow. The drainage network in study area is dendritic in nature.

11.3.2 Climate and micro-meteorology

The climate of region is mainly tropical type. Monthly average of minimum temperatures recorded at IMD station Angul from 1991-2020, ranges from 13.6°C to 25.6°C and maximum temperature ranges from 28.7°C to 40.2°C and total of average monthly rainfall is 1272.6 mm.

The micro meteorological data of the core zone has been recorded using an automatic weather station from 1st March to 31st May 2022. The temperature ranged between 20.22°C to 43.74°C and relative humidity ranged between 36.6% to 86.4% during the monitoring period. The wind speed varied between 0.07 to 19.4 km/hr and the predominant wind direction was observed from south east with 14.5% of occurrences (including calm).

11.3.3 Ambient air quality

Ambient air quality study was monitored at 8 locations. One location was in the core zone (project area). Seven stations were in buffer zone at Chararhagarhia, Bhanuparha, Jharbhandh, Naraharipur Shasan, Motanga Meramandali Bazar and Gandijhara villages. Twenty four hour average PM10 level was found to range from 38.2 to 67.9 µg/m^3, PM 2.5 was found to vary from 22.8 to 41.6 µg/m^3, SO_2 from BDL to 16.2 µg/m^3 and NO_2 from 7.6 to 22.1 µg/m^3. Carbon monoxide, Ammonia, Benzo(a) Pyrene, Benzene, Lead, Arsenic and Nickel were also measured and found within permissible limit or below detectable limit.

11.3.4 Water resource and quality

Brahmani river and it's tributaries control the drainage of the study area. Brahmani is a perennial river. The drainage pattern is dendritic in nature

Nine surface water samples were collected. These were (i) reservoir within existing plant area, (ii) Pond in Chararhagarhia village, (iii) Lingara nadi near Gandhijhara village (up stream), (iv) Lingara nadi near Motanga village (down stream), (v) Pond near Chararhagarhia, (vi) Pond in Nimabahali village, (vii) Brahmani River near Kusnapanga village (up stream) (viii) Brahmani River near Bido village (down stream) and (ix) Canal in expansion area.

Eight ground water samples were collected. These were from (i) existing plant area (borewell), (ii) Chararhagarhia (handpump), (iii) Nuagan village (hand pump), (iv) Jharbandh village (hand pump), (v) Chitiparha village (hand pump), (vi) Meramandali village (hand pump), (vii) Shibapur Village (hand pump) and (viii) Galaparha village (hand pump). It is observed that the surface water and ground water quality is within the permissible limits as specified by IS: 10500 - 2012 for drinking purposes except Total hardness, Total Alkalinity, Magnesium in Chararhagarhia village (handpump) water.

11.3.5 Land use pattern and soil quality

Existing plant premises area is 21.257 hectares. Additional land required for expansion will be 37.869 hectares. The total plot area after expansion shall be 59.126 hectares. 37.869 hectares additionally required land area consists of 33.061 hectares private land and 4.808 hectares government land. It does not have any forest land.

Land use pattern of study area is available from Census 2011. The data shows that 51.12% is net area sown, 20.78% is area under non-agricultural uses, 11.80% is barren and un-cultivable land, 4.08% of total area is forest land, 3.77% is fallows land other than current fallows, 3.76% is permanent pastures and other grazing land, 2.55% is current fallows, 1.44% land under miscellaneous tree crops and 0.69% is culturable waste land.

Top soil samples were collected from four locations. One from existing core zone of the project site, two from expansion plant area in south direction and north direction and one from Chararhagarhia village at 0.5 km in west direction. Texture of soil is medium grained sand and dark brown to medium brown in colour.

The soil is slightly acidic to moderately alkaline in nature. Conductivity of soil shows it is salt free. Organic carbon in two soil samples is deficient and optimum in other two. Soil is deficient in nitrogen, phosphorous and potassium.

11.3.6 Noise and traffic volume

Noise levels at eight stations were observed. One station was within the core area and seven within buffer area. Leq values observed during day time varies from 50.04 to 65.18 dB (A) and at night time varies from 39.55 to 57.20 dB (A).

A traffic density survey was conducted at two locations. The first was on NH55 from Angul to Dhenkanal (Near Nimabahali Bazar Village) at a distance of 0.7 km north east and second was on road from NH 55 to Plant at a distance of 0.9 km in ENE. Total number of equivalent passenger car units were found as 28,665 and 595 per day respectively at the two locations.

11.3.7 Ecology

There are no national parks or wildlife sanctuaries within 10 km radius. The nearest National Park is Simlipal (proposed) at a distance of 136.27 km in north east direction. The nearest sanctuary is Satkosia Gorge sanctuary at a distance of 21.25 km in south west. Mahanadi Elephant Reserve (proposed) is at a distance of 21.91 km in south west and Kahneijena-Anantpur elephant corridor is at a distance of 25.49 km in north west.

Forest of the study area are classified as Tropical Moist Deciduous Forest 3C by Champion and Seth. There are 13 trees, 7 shrubs, 3 herbs and 4 grasses in core zone. There are 41 species of trees, 2 species of bamboo, 15 species of shrubs, 8 species of herbs, 11 species of climbers and 4 species of grasses in buffer zone.

A total of 43 species of terrestrial fauna were recorded in the study area. These comprise 11 species of mammals, 11 species of reptiles, 2 species of amphibians, 19 species of birds and 21 fish species have been recorded by researchers at Brahmini river near Kamalanga.

11.3.8 Socio-economic conditions

There is no habitation within the project area. There are no displacees. There are only land losers for the balance land to be acquired (33.061 hectares).

There are 147 inhabited villages and census towns in the buffer zone of the study area. The total population within the study area is 1,70,881 persons, as per Census 2011. It includes 89,198 males and 81,683 females. The schedule caste population is 23.05% and schedule tribe population is 5.25%. The average literacy rate is 71.29%. The literacy amongst women is lower at 30.88%. Main workers are 24.00% of the total population. Marginal workers are 10.52 % and 65.47% are non workers.

11.3.9 Places of archaeological/ historical/ tourist/ religious importance and other industries

There is no important archaeological (ASI)/ historical place or other place of tourist or religious importance within the study area except village temples, mosques & other places of prayer. There are about 23 industries and mines within 10 km radius of the project. These are steel and ferro alloys manufacturing units, brick kilns and crushers.

11.4 ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT

11.4.1 Topography and drainage

Impact: Permanent change in topography has occurred in 21.257 ha area in existing plant due to leveling and construction activities of the past. There will be permanent changes in topography in future due to leveling and construction in expansion area of 37.869 ha. This will be due to construction of buildings, plant facilities, tailing management facility, stock yards, area for solid waste management, green belt & plantation, administration buildings, water reservoir, roads, etc. The change in topography will require management of rain water flow in project area. There will be no impact on topography of the buffer zone.

One first order and one second order drain is visible on toposheet. However, on ground, these are low lying areas where villagers carry out agriculture also. Hence, well defined channel do not exist on ground. However, the runoff from these areas will have to be managed. Impact on the drainage in the buffer zone is not anticipated because no construction will be taking place outside project boundary.

Management: The change in topography in the core zone will be permanent and irreversible. Excavated soil will be used in leveling, filling and landscaping to minimise the impact of change in topography. Changes in drainage shall have to be managed through construction of storm water drains. The flow from the low lying areas shall be realigned during construction and operation through linear drainage system connecting the flow from western side to the Lingara Nadi on eastern side of the plant. The flow volume will reduce by the quantum used for rain water harvesting. Thus, the impact of the new construction on drainage will be managed.

11.4.2 Climate and meteorology

Impact: The climatic conditions including temperature variations, wind direction and speed, rainfall and humidity are governed by regional factors and the monsoon. As such proposed ferro alloys plant, power plant and other allied activities will not tend to influence the climate. However, emission of greenhouse gases due to combustion of fossil fuels and localised temperature rise in vicinity of chimneys and buildings will be there.

Management: Development of greenbelt in the plant premises over 33% area of the total project area will be done during construction phase. The trees planted will help in sequestering of carbon. The company will also undertake measures to minimise the CO_2 emissions by using better quality raw materials and fuels. Regular maintenance of all fossil fuel based machinery and equipment shall be done to ensure that their emissions remain within limit.

11.4.3 Ambient air quality

Impact: During the construction phase there will be several sources of air pollution. These will be vehicle exhausts, dust generation due to excavation work, shifting of construction materials (cement, sand and gravel), vehicle movement on unpaved roads and exhaust from diesel based construction equipment. Primary impact will be dust generation causing an increase in suspended particulate matter levels in the surrounding areas. The secondary impacts of gaseous emissions and dust may be on the health of the workers and villagers living in close vicinity. During operation phase, the emissions will be due to process stack emissions, material handling in stock yards, crushing, fugitive dust within project and due to transportation.

Management: During construction, the dust generated due to excavation, leveling and transportation activities will be control by sprinkling of water. Construction equipment will be maintained regularly to minimize source emissions. During both construction and operation, all trucks being used for transportation of construction material, raw material and finished product will be covered with tarpaulin to prevent spillage, maintained, optimally loaded and have PUC certificates. During operation, high efficiency bag filters will be installed to control the particulate emission from the furnaces. Electrostatic precipitator shall be installed at the power plant. Sprinkling systems will be installed during crushing and slag processing to control dust. The establishment of the project is expected to cause an increase of pollutants at ground level around the project. The impact on surrounding air quality has been calculated using a mathematical model. There will be an increase by 21.79 $\mu g/m^3$, 15.18 $\mu g/m^3$, 33.97 $\mu g/m^3$ and 10.22 $\mu g/m^3$ for PM10, $PM_{2.5,}$ SO_2 and NOx, respectively. The traffic movement due to project, on public roads will also cause an increase in pollutants. This will cause an increase by 0.14 $\mu g/m^3$, 0.03 $\mu g/m^3$, 0.00 $\mu g/m^3$ and 0.03 $\mu g/m^3$ for PM10, $PM_{2.5,}$ SO_2 and NO_2, respectively. After these increments, the impact of the project will remain within permissible limits of National Ambient Air Quality Standards 2009, for business as usual scenario.

11.4.4 Water environment

Impact: During construction phase, the requirement of water will be on account of concrete mixing, curing, cooling water for various machines, spraying, sprinkling for dust suppression, irrigation for plantation and for greenbelt and landscaping. Waste water generation will be from construction workers and cleaning activities.

During operation phase, water will be required for process. It will be taken from Lingara nadi, Brahmani river and harvested rain water. Drinking water will be sourced from borewells. The total waste water generation from the existing & proposed ferro alloys plant will be 11 KLD.

Management: During construction phase, mobile toilet block shall be provided for construction workers. The sewage will be treated in portable batch type sewage treatment plant.

During operation phase, the discharge will be from cooling water system. It will be collected in water tank and used for dust suppression and greenbelt. The sewage from toilets, washrooms and canteen shall be treated in sewage treatment plant and reused. Sludge removed will be used as manure. The water in the tailings of beneficiation plant will be 100% recirculated back into the beneficiation plant in a close loop. The project will have zero liquid effluent discharge in non-monsoon. In monsoons, runoff water as well as unutilised treated water shall be discharged.

The rainwater falling on rooftops of buildings, roads and open areas will be routed to the raw water reservoir for storage and reuse. Rain water from green area will be recharged to the ground through trenches.

11.4.5 Land use and soil quality

Impact: Existing plant premises area is 21.257 hectares and under industrial use. Additional land required for expansion will be 37.869 hectares whose pre-industrial use is 43.97% agriculture, 41.86% industrial and 14.18% others (grazing, barren, water body, road & debasthali). The total plot area after expansion shall be 59.126 hectares. Construction and development has taken place in 21.257 hectares and will take place in 37.869 hectares. There will be construction of roads, water reservoir, buildings, raw material shed, product shed, green belt, etc. The construction activities will disturb the top soil. The temporary storage yard for raw material and slag can also impact the soil quality.

Management: The topsoil generated during construction in expansion area will be removed carefully, stored temporarily and spread over area where additional plantation is proposed. Stabilisation of soil with plants will minimise erosion. One third of total project area will be under greenbelt. The raw material yard and slag yard will have lining to prevent percolation of contaminants during rainfall. The land use of the expansion area will permanently become industrial use.

11.4.6 Noise

Impact: The noise level during construction will be due to construction machinery and activities. It will be of temporary and reversible nature. During operation, noise will be generated due to operation of various equipment, machinery, pumps, crusher, etc. The noise level at sources are anticipated to be between 90-110 dB(A).

Management: The machinery shall be provided with acoustic shields and enclosures to limit the sound level inside the plant. Vibration dampners shall be used during erection of machinery. Maintenance of machines and vehicles will be done regularly. The proposed green belt will also help to prevent noise generated within the project from spreading beyond the project boundary. Earmuffs/ plugs will be provided to the workers deployed in the close vicinity of noise source.

11.4.7 Traffic

Impact: Raw material transportation is being carried out and shall be carried out after expansion also from various locations in Odisha, Chhattisgarh and Maharashtra. Manufactured finished products will be sold in the open markets available in Dhenkanal, Bhubaneshawar and Talcher city. There will be additional to and fro movement of 1028 trucks per day of 20-25 tonnes capacity due to expansion. This is equivalent to 3084 passenger car units. The impact of traffic will be felt on the roads and adjoining habitation. They will utilise 3.43% of the maximum carrying capacity of the approach road (7 m width) from NH-55 and 1.46 % of the NH-55 (18 m width).

Management of traffic: All trucks used for transportation of raw material and finished product will be covered with tarpaulin, maintained, optimally loaded and have Pollution under control (PUC) certificates. Trucks will be weighed at the weigh bridge to ensure optimal loading, which in turn optimizes emissions. Pollution Under Control (PUC) certificates will be obtained every three months or more depending upon the category of vehicle. In case of petrol vehicles, idling CO measurements will be taken and in case of diesel vehicles, free acceleration smoke will be measured. Water sprinkling on roads and parking area within plant will be done periodically to mitigate dust. Speed breakers and caution signs will be installed along roads. Tyre washing facilities shall be provided at gate.

11.4.8 Solid waste

Impact: During the construction phase, the generation of solid waste will be low. It will comprise of waste construction material and used packaging material, boxes, containers, etc. In the operation phase, the main solid waste generated will be slag from ferro alloys production. After metal recovery from slag, the reject slag will be the main waste. Another solid waste will be the dust collected in bag filters. There shall be fly ash and bottom ash from the boiler of the power plant and fly ash from electro static precipitator attached to power plant. Domestic waste shall be generated from workers during construction as well as operation phase.

Management: Construction wastes will be segregated at site itself. The recyclable material will be recovered for reuse or sale. The non-recyclable material shall be used for leveling. Litter collection bins will be installed around the work site. Empty packaging materials, drums, glass, tin, paper, plastic, pet bottles, wood, thermocol and other packaging materials, solder

butts, etc. will be disposed through recyclers. Domestic waste will be generated from the plant office, organic component of which shall be composted/ vermi composted and used as manure.

Solid waste management during operation shall be as follows:

- **Ferro manganese slag**- 47% directly reusable in ferro-silicon manufacturing in-house and balance sold to other manufacturers
- **Ferro silicon slag-** 100% reusable in in house sinter plant.
- **Ferro-chrome slag-** 100% to be sent for Chrome recovery (~5%) through Chrome Beneficiation Plant. After Toxicity Characteristic Leaching Procedure (TCLP) test on remaining material (~95%), it will be used as landfill/ base material in roads (when Chromium within permissible limits), else sent to the nearest Treatment, Storage, and Disposal Facility (TSDF) facility. Fe-Cr slag is also reusable for making in refractory castables in non recovery coke oven batteries, coal-fired power boilers, industry furnaces, etc.
- **Silico manganese slag -** 100% to be sent to metal recovery plant for Manganese recovery (~5%), balance (95%) usable as construction sand
- **Pig iron slag -** 100% to be sent to metal recovery plant for Fe recovery(~5%), balance (95%) usable as construction sand
- **Rejects from metal recovery plant (silico-managnese/ pig iron) -** 100% reusable as construction sand, as road base, filling and construction
- **Rejects from chrome beneficiation plant -** after dewatering from tailing, 100% reusable as road base, filling and construction after Toxicity Characteristic Leaching Procedure (TCLP) test & when chromium will be within permissible limits
- **Sinter plant fines** shall go back into the sinter plant
- The **fines collected in bag filters** and from material handling will be used for sinter making. The sinter will be used in ferro alloys manufacturing.
- Thus, entire waste from the submerged arc furnace will be re-utilisable.
- **Ash from power plant & electro static precipitator -** 100% reused as per Fly Ash Utilisation Notification 1999 and its amendments of 2003, 2009, 2016, 2022. Sent for cement making, brick making, block making, aggregate making and road making.
- The yards for raw material, slag and ash will be laid on top of a liner to avoid leaching of contaminants during monsoon.

11.4.9 Ecology

Impact: Since the boundary wall of the existing plant has already been made in the past, there is little interaction of the existing project area with

surrounding large sized fauna. Similarly, boundary wall of proposed expansion area will also restrict any man-animal conflict. There is no forest land in the project area. Minimum adverse impact of proposed project is anticipated on the flora or fauna in the immediate surroundings. This conclusion is based on the low biodiversity level of the surrounding areas and air quality prediction modelling, which indicates that the average resultant pollutant values shall remain within the national ambient air quality standards.

Management: Total existing plant area is 21.257 hectares out of which 7.082 hectares is green belt. This is 33 % of existing plant area. After expansion, plant area will become 59.126 hectares and green belt will be 33.11% (19.579 hectares) of the plant area. Plantation of saplings at the rate of 2500 trees per hectare shall be carried out to make a three-tier green belt along the peripheral boundary and in designated plantation area. Hence, approximately 12500 trees will be planted for expansion area. The greenbelt will act as a micro-habitat for small sized mammals and birds. The trees to be planted shall be of native species such as Siris, Neem, Mango, Peepal, Kaju, Bel, Kendu, Mahul, etc. and bio indicators such as Gulmohar.

11.4.10 Socio-economics

Impact: There are no households to be displaced from project site. There are only land losers in the expansion area land. 16.16 ha private land directly has been purchased from land owners. 16.90 hectares private land has to be directly purchased from land owners. Balance government land of 4.808 hectares is also to be obtained. Approximately 300 persons will be required during construction phase. During operation phase, 1500 people will be required for direct employment. In addition to this, there will be similar number of persons indirectly employed due to the project.

Management: Most of the work force required for construction and operation phase will be taken from the surrounding areas, to the extent possible. This will have a positive socio-economic impact on local people due to steady income. Training for capacity building shall be supported by the company. This will enable local persons to become employable. Thus, the direct and indirect employment will lead to economic growth. The company will also carry out activities for social welfare. The commitments made during public hearing shall also be fulfilled.

11.4.11 Occupational Health

The Company has and will have a safety officer who will be the Deputy Manager (Safety). He has and will develop, implement and monitor Occupational Health and Safety Policy, Programs and Procedures. A first aid center is there in existing plant area, which will be enhanced and used for expansion. It will be equipped and manned by competent person. First-aid boxes will be provided and maintained in different locations. Personal protective equipment's (PPE) will be provided to all the workers. Regular

safety training will be conducted. Company shall put 100% efforts for a zero accident rate.

11.5 ANALYSIS OF ALTERNATIVES

After analysis of alternative sites, the location of the expansion plant has been chosen because this proposed project site is adjacent to the existing plant. It is most suitable from the point of utilising existing resources and cost control. The technologies which will be used in the proposed plant are primarily used by many ferro alloys industries. Submerged arc furnaces have been chosen as the manufacturing route.

11.6 ENVIRONMENTAL CONTROL AND MONITORING ORGANISATION

Rungta Mines Ltd. already has an Environment Management Department at the headquarter. There is an environment cell at the project also. They both are and shall be responsible for implementation of environment management plan. It will also be responsible for environmental monitoring. Regular monitoring of the statutory environmental parameters will be taken up. The total capital investment on environmental monitoring is envisaged as Rs. 231.4 lakhs and recurring expenditure during operation will be Rs. 74.52 lakhs /year for expansion phase.

11.7 ADDITIONAL STUDIES

Risk Assessment : All types of industries face certain types of hazards which can disrupt normal activities abruptly. The can lead to disaster like fires, inundation, failure of machinery, explosion, oil spillage, electrocution, etc. The aim of the disaster management plan is to take precautions, prevent hazard from occurring and avert disaster. It also plans for actions that are taken after a disaster occurs. This limits the damage to the minimum. To tackle a disaster situation, an emergency control room has been and will be set up with communication facility. The emergency team is and shall be headed by the plant manager, who is and will be called Site Main Controller.

Public Consultation: The draft EIA report has been prepared on the basis of which the public consultation will be held. Action plan to address the issues raised during public consultation will be added after conduct of public hearing.

11.8 PROJECT BENEFITS

The additional direct employment generation from expansion project will be 1500 persons during operation. In addition to this, there will be similar number of persons indirectly employed due to the project. As majority of unskilled and semi-skilled persons will be from the surrounding villages, the local population will be benefited. Social welfare activities shall be carried out by the project management in the surrounding villages. It will be for improving social infrastructure (road, drainage, water supply, schools, etc.)

and for activities desired by villagers. The amount earmarked shall be as per the corporate social responsibility program under the Companies Act 2013, which requires 2% of the average profit of the previous three years to be spent annually.

11.9 ENVIRONMENT MANAGEMENT PLAN

The environment cell at site shall be responsible for implementation of environment management plan, developing greenbelt, ensuring good housekeeping, statutory compliance as well as creating environmentally aware work forces. Regular monitoring of the statutory environmental parameters will be taken up. The parameter wise management plan comprises of following:

- **Air quality management plan:** provision of dust extraction system and bag filter connected to submerged arc furnace, electro static precipitator connected to power plant chimney, sprinkling on roads and material handling areas, green belt for absorption of pollutants.
- **Noise level management plan:** plant machinery will be established in enclosed shed to prevent noise propagation to surrounding, machines will have vibration dampners, diesel generator set will have acoustic enclosure, boundary wall and green belt will also absorb and mitigate noise.
- **Solid waste and hazardous waste management plan:** Slag generated from Ferro Alloys plant is 100% reuseable for direct use or metal recovery. After metal recovery, the rejects have several uses such as construction material or filling of low lying areas. The fines generated from bag filter will be recycled in the production process after sintering. The fly ash from electro static precipitator and ash from boiler is usable for cement making, brick making, block making, aggregate making and road making.
- **Effluent management plan:** There will be no process discharge from the plant. The blow down from the cooling system of the furnaces and power plant shall be reused for sprinkling and green belt watering.
- **Storm water management plan:** There will be rain water harvesting from roof tops. Rain water from the premises will be collected through storm water drainage system, recharged to the extent possible and sent to settling tank prior to release to natural drain.
- **Occupational health and safety management plan:** Pre-induction and during employment monitoring of occupational health shall be carried out as per Odisha Factories Rules 1950. First aid room with necessary medicines will be maintained as per norms. Personal protective equipment (PPE) will be provided to workers. Regular training shall be provided for safe handling of material and machines. Company shall put 100% efforts for a zero accident rate. These measures are already in place for existing plant.

- **Proposed Green belt development plan:** shall be undertaken over 33% of the plot area comprising of 12.497 hectare land and planted with native species.

- **Socio economic management plan:** social welfare measures to fulfill to the issues raised during public hearing.

The total investment for the proposed project is Rupees 950 Crores. The environmental management cost for the project shall be Rs. 3842.52 capital cost and Rs. 1692.14 lakhs/ annum recurring cost for expansion phase. This includes monitoring cost.

11.10 DISCLOSURE OF CONSULTANTS

The consultants engaged for the preparation of the EIA/EMP of the project are Min Mec Consultancy Pvt. Ltd. It was registered in July 1983 with the Registrar of Companies, Delhi & Haryana, India. In 1994, Min Mec established a modern R&D Laboratory. Min Mec is ISO 9001: 2015 certified under ANZ-JAS. In June 2006, the laboratory received accreditation from NABL, which has been renewed as per procedure since (latest certificate no. TC-6337). In 2012, lab had been accredited under Environment Protection Act (EPA) by Ministry of Environment, Forest & Climate Change, Government of India and renewed till 2024. The laboratory also has ISO 14001:2015 and ISO 45001:2018 certification. On 25.02.2021, Min Mec Consultancy was accredited by QCI-NABET as Mine Plan Preparing Agency (MPPA). Min Mec was accredited by QCI-NABET for preparing EIA/EMP Reports vide Accreditation Certificate No. NABET/ EIA/2225/IA 0096 valid till 29.03.2025.

CHAPTER 12

DISCLOSURE OF CONSULTANTS ENGAGED

Min Mec Consultancy Pvt. Ltd., New Delhi, provides services in the field of environmental impact assessment and management for all types of mines (coal/ non-coal), industries (chemical/ cement/ steel industries, power stations, infrastructure projects, etc.), risk analysis, disaster management, environmental health and safety auditing, socio-economic studies, R&R studies, mine planning and engineering software development. Min Mec conducts studies as per international requirements such as those for IFC/ World Bank/ CIDA/ JICA sponsored projects and of national standards of MoEF&CC.

Min Mec Consultancy Pvt. Ltd was registered in July 1983 with the Registrar of Companies, Delhi & Haryana, India. In 1994, Min Mec established a modern R & D laboratory. On 02.02.2003, Min Mec received ISO 9001 certification under ANZ-JAS which is renewed periodically. In June 2006, the laboratory received accreditation from NABL for compliance to ISO 17025 (latest certificate no. TC-6337 valid upto 16.03.2024). The laboratory is recognised by MoEF&CC (Gazette Notification No. S.O. 3744 (E) dated 17.10.2019, valid for 5 years). The laboratory also received ISO 14001 certification in the year 2011, which has been renewed regularly. In 2011, the laboratory had received its first OHSAS 18001 certification and now it is ISO 45001:2018 certified. In 2021, NABET accredited Min Mec Consultancy as Mine Plan Preparation Agency and in 2022 as EIA Consultant Organisation (Certificate No. NABET/EIA/2225/IA 0096 valid upto 29.03.2025).

Services and expertise

Services are provided to the following sectors

- Mines-surface and under ground for all minerals and metals
- Infrastructure projects such as jetties, highways, water supply pipelines projects, power stations, canals, minor dams, etc.
- Industries such as cement plants, smelters, steel, chemicals, pharmaceuticals, petrochemicals, salt works, pesticides and other hazardous and polluting industries.

As on March 2022, the following projects have been executed or under way since the inception of the company:

Studies	Numbers
EIA/EMP, Environmental Studies, obtaining ECs & NOCs, EC amendments, validity extensions, EC/ NOC compliances, etc.	396
Mine Planning and Mine Closure Plans(Coal/non coal)	138
Hydro-geological, hydrological and Nala diversion studies	74

Studies	Numbers
Pre-feasibility studies/Techno Economic Feasibility reports (coal blocks)	60
Feasibility studies (sponge iron & power plants)	40
Traffic Impact Assessment Studies	29
Risk Analysis & Disaster Management Plan	17
Socio Economics surveys & studies	15
Due diligence for bank financing/ lenders consultant	18
Satellite Imagery Interpretation	12
Market surveys	8
Wildlife conservation plan	11
Detailed Project Reports for Water supply, drainage & sewage survey and design	4
EHS audits	4
Regional Studies	2
Others (due diligence, satellite imagery interpretation, softwares etc.)	6
Clearance from Airport Authority	3
Total	**837**

Personnel

Min Mec has a strong team of in-house experts in EIA, EMP, DMP, RA, EHS, mining, socio economics and software development. The team of experts is supported by a panel of experts in various fields with an average experience of over 30 years.

Team engaged

The team involved in EIA preparation is given in **Table 12.1**.

TABLE 12.1: TEAM INVOLVED IN EIA PREPARATION AND THEIR ROLES

Expert Name	Qualifications	Experience
B. D. Sharma	M. Tech (Hons), B. Tech (Min.), PG Diploma (Env. & Ecology)	Since, 1973 active in pit head industries like cement, power, etc., mining sector and allied activities (washeries, beneficiation etc.) with 40 years in environmental impact assessment, management and planning with over 300 projects executed.
Dr. Marisha Sharma	Ph.D., M. Plan (Env.), BE (Civil) PG Certificate in participatory management of displacement, resettlement and rehabilitation	Since 2001, experienced in preparation of EIA/EMP for cement plants, steel plants, new construction projects, mines, thermal power plants, townships, etc. Certified Energy auditor & visiting faculty to School of Planning & Architecture. Experienced in hydrogeological studies, traffic studies, social surveys, Resettlement & Rehabilitation planning, etc
Rashmi Gupta	M.Sc.	Since 2006, experienced in ecology and biodiversity, ecological surveys and preparation of

Expert Name	Qualifications	Experience
	(Environment)	flora - fauna lists, wildlife conservation plan (if required), environmental data interpretation and preparation of EIA/EMP report.
M.S. Yadav	M. Sc. (Environment)	Since 1995, experienced in survey data processing, Census data analysis, identifying and assessing quantum of emissions, computer based impact prediction modelling for air (including GLC mapping), noise modelling, meteorological data processing, etc.
Gaurav Yadav	M.Sc. (Env. Sc.), B.Sc. (Life sciences)	Since 2012, research in bioremediation of water pollutants, water & soil quality analysis, ecological studies, microbiology studies and impact of pollutants on environment
Pinaki Dasgupta	B. Tech (Chemical Engineering), PGB+ MBA (Energy Management), Pursuing PhD	Since 2002, into environmental clearance, factory license, groundwater, scientific research, basic engineering design, fire fighting, safety audits, on site emergency plan, mock drills, environmental management plans, safety trainings, basic engineering design plans, detailed project reports, market research, feasibility reports, sustainability (LCA) reporting, creativity and sustainability, emergency preparedness

Laboratory:

Environmental monitoring and testing has been done by Earthcare Labs Private Limited, Nagpur, recognised by MoEF&CC (Gazette Notification No. S.O. 2131 (E) dated 01.06.2021 at Sl. 101 and valid for 5 years). The recognition gazette is given in **Annexure XIX.**

ANNEXURES

No.IA-J-11011/515/2022-IA-II(IND-I)

Goverment of India

Minister of Enviroment,Forest and Climate Change

Impact Assessment Division

***

Indira Paryavaran Bhavan,
Vayu Wing,3rd Floor,Aliganj,
Jor Bagh Road,New Delhi-110003
01 Dec 2022

To,

M/s RUNGTA MINES LIMITED
8A, Express Tower, 42A- Shakespere Sarani, Kolkata-700017, West Bengal, India,
Dhenkanal-700017
Orissa

Tel.No.-; Email:environment.dsp@rungtamines.co.in

Sir/Madam,

This has reference to the proposal submitted in the Ministry of Environment, Forest and Climate Change to prescribe the Terms of Reference (TOR) for undertaking detailed EIA study for the purpose of obtaining Environmental Clearance in accordance with the provisions of the EIA Notification, 2006. For this purpose, the proponent had submitted online information in the prescribed format (Form-1) along with a Pre-feasibility Report. The details of the proposal are given below:

1. Proposal No.:	IA/OR/IND1/403580/2022
2. Name of the Proposal:	Expansion of Ferro Alloys Plant (0.055 MTPA to 0.293 MTPA Ferro Alloys along with 150 MW CPP)
3. Category of the Proposal:	Industrial Projects - 1
4. Project/Activity applied for:	1(d) Thermal Power Plants 2(b) Mineral beneficiation 3(a) Metallurgical industries (ferrous & non ferrous)
5. Date of submission for TOR:	26 Nov 2022

In this regard, under the provisions of the EIA Notification 2006 as amended, the Standard TOR for the purpose of preparing environment impact assessment report and environment management plan for obtaining prior environment clearance is prescribed with public consultation as follows:

ACTIVITY 3 (a)- METALLURGICAL INDUSTRY (Ferrous and Non-ferrous)

STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR METALLURGICAL INDUSTRY (Ferrous and Non-ferrous) AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

GENERAL CONDITIONS-

1. Introduction

i. Background about the project
ii. Need of the project
iii. Purpose of the EIA study
iv. Scope of the EIA study

2. Project description

A. Site Details

i. Location of the project site covering village, Taluka/Tehsil, District and State.
ii. Site accessibility
iii. Adigital toposheet in pdf or shape file compatible to google earth of the study area of radius of 10km and site location preferably on 1:50,000 scale. (including all eco-sensitive areas and environmentally sensitive places).
iv. Latest High-resolution satellite image data having 1m-5m spatial resolution like quickbird, Ikonos, IRS P-6 pan sharpened etc., along with delineation of plant boundary co-ordinates. Area must include at least 100m all around the project location.
v. Environment settings of the site and its surrounding along with map.
vi. A list of major industries with name, products and distance from plant site within study area (10km radius) and the location of the industries shall be depicted in the study area map.
vii. In case if the project site is in vicinity of the water body, 50 meters from the edge of the water body towards the site shall be treated as no development/construction zone. If it's near the wetland, Guidelines for implementing Wetlands (Conservation and Management) Rules, 2017 may be followed.
viii. In case if the project site is in vicinity of the river, the industry shall not be located within the river flood plain corresponding to one in 25 years flood, as certified by concerned District Magistrate/Executive Engineer from State Water Resources Department (or) any other officer authorized by the State Government for this purpose as per the provisions contained in the MoEF&CC Office Memorandum dated 14/02/2022.
ix. Type of land, land use of the project site.
x. Status of acquisition of land. If acquisition is not complete, stage of the acquisition process as per the MoEF&CC O.M. dated 7/10/2014 shall be furnished.
xi. Engineering layout of the area with dimensions depicting existing unit as well as proposed unit indicating storage area, plant area, greenbelt area, utilities etc. If located within an Industrial area/Estate/Complex, layout of Industrial Area indicating location of unit within the Industrial area/Estate.

B. Forest and wildlife related issues (if applicable):

i. Status of Forest Clearance for the use of forest land shall be submitted.
ii. Copy of application submitted for clearance under the Wildlife (Protection) Act, 1972, to the Standing Committee of the National Board for Wildlife if the project site located within notified Eco-Sensitive Zone, 10km radius of national park/sanctuary wherein final ESZ notification is not in place as per MoEF&CC Office Memorandum dated 8/8/2019.
iii. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas, the project proponent shall submit the map duly authenticated by Divisional Forest Officer showing the distance between the project site and the said areas.
iv. Wildlife Conservation Plan duly authenticated by the Competent Authorityof the State Government for conservation of Schedule I fauna, if any exists in the study area.

C. Salient features of the project

i. Products with capacities in **Tons per Annum** for the proposed project.
ii. If expansion project, status of implementation of existing project, details of existing/proposed products with production capacities in Tons per Annum.
iii. Site preparatory activities.
iv. List of raw materials required and their source along with mode of transportation.
v. Other than raw materials, other chemicals and materials required with quantities and storage capacities.
vi. Manufacturing process details along with process flow diagram of proposed units.
vii. Consolidated materials and energy balance for the project.
viii. Total requirement of surface/ ground water and powerwith their respective sources, status of approval.
ix. Water balance diagram
x. Details of Emission, effluents, hazardous waste generation and mode of disposal during construction as well as operation phase.
xi. Man-power requirement.
xii. Cost of project and scheduled time of completion.
xiii. Brief on present status of compliance (Expansion/modernization proposals)
a. Cumulative Environment Impact Assessment for the existing as well as the proposed expansion/modernization shall be carried out.
b. In case of ground water drawl for the existing unit, action plan for phasing out of ground water abstraction in next three years except for domestic purposes and shall switch over to 100 % use of surface water from nearby source.
c. Copy of all the Environment Clearance(s) including Amendments thereto obtained for the project from MoEF&CC/SEIAA shall be attached as an Annexure. A certified copy of the latest Monitoring Report of the Regional Office of the Ministry of Environment and Forests as per circular dated 30th May, 2012 on the status of compliance of conditions stipulated in all the existing environment clearances including amendments shall be provided.
d. In case the existing project has not obtained EnvironmentClearance, reasons for not taking EC under the provisions of the EIA Notification 1994 and/or EIA Notification 2006 shall be provided. Copies of Consent to Establish/No Objection Certificate and Consent to Operate (in case of units operating prior to EIA Notification 2006, CTE and CTO of FY 2005-2006) obtained from the SPCB shall be submitted. Further, compliance report to the conditions of consents from the Regional Office of the SPCB shall be submitted.

3. Description of the Environment

i. Study period
ii. Approach and methodology for data collection as furnished below.

Attributes	Sampling		Remarks
	Network	Frequency	
A. Air Environment			
Micro-Meteorological • Wind speed (Hourly) • Wind direction • Dry bulb temperature • Wet bulb temperature • Relative humidity • Rainfall • Solar radiation • Cloud cover • Environmental Lapse Rate	Minimum 1 site in the project impact area	1 hourly continuous	• IS 5182 Part 1-20 • Site specific primary data is essential • Secondary data from IMD, New Delhi • CPCB guidelines to be considered.
Pollutants • $PM_{2.5}$ • PM_{10} • SO_2 • NOx • CO • HC • Other parameters relevant to the project and topography of the area	At least 8-12 locations	As per National Ambient Air Quality Standards, CPCB Notification.	• Sampling as per CPCB guidelines • Collection of AAQ data (except in monsoon season) • Locations of various stations for different parameters should be related to the characteristic properties of the parameters. • The monitoring stations shall be based on the NAAQM standards as per GSR 826(E) dated 16/11/2009 and take into account the predominant wind direction, population zone and sensitive receptors including reserved forests, • Raw data of all AAQ measurement for 12 weeks of all stations as

Attributes	Sampling		Remarks
	Network	Frequency	
			per frequency given in the NAAQM Notification of 16/11/2009 along with min., max., average and 98% values for each of the AAQ parameters from data of all AAQ stations should be provided as an annexure to the EIA Report.
B. Noise			
• Hourly equivalent noise levels	At least 8-12 locations	As per CPCB norms	-
C. Water			
Parameters for water quality • pH, temp, turbidity, magnesium hardness, total alkalinity, chloride, sulphate, nitrate, fluoride, sodium, potassium, salinity • Total nitrogen, total phosphorus, DO, BOD, COD, Phenol • Heavy metals • Total coliforms, faecal coliforms • Phyto plankton • Zoo plankton	Samples for water quality should be collected and analyzed as per: • IS: 2488 (Part 1-5) methods for sampling and testing of Industrial effluents • Standard methods for examination of water and wastewater analysis published by American Public Health Association.		
For River Bodies • Total Carbon • pH • Dissolved Oxygen • Biological Oxygen Demand • Free NH4 • Boron • Sodium Absorption Ratio • Electrical	• Surface water quality of the nearest River (60m upstream and downstream) and other surface water	• Yield of water sources to be measured during critical season • Standard methodology for collection of surface water (BIS standards)	

Attributes	Sampling		Remarks
	Network	Frequency	
Conductivity	bodies		
For Ground Water	• Ground water monitoring data should be collected at minimum of 8 locations (from existing wells /tube wells/existing current records) from the study area and shall be included.		
D. Traffic Study			
• Type of vehicles • Frequency of vehicles for transportation of materials • Additional traffic due to proposed project • Parking arrangement	-		
E. Land Environment			
Soil • Particle size distribution • Texture • pH • Electrical conductivity • Cation exchange capacity • Alkali metals • Sodium Absorption Ratio (SAR) • Permeability • Water holding capacity • Porosity	Soil samples be collected as per BIS specifications		
Land use/Landscape • Location code • Total project area • Topography • Drainage (natural) • Cultivated, forest, plantations, water bodies, roads and settlements	-		
E. Biological Environment			

Attributes	Sampling		Remarks
	Network	Frequency	
Aquatic • Primary productivity • Aquatic weeds • Enumeration of phyto plankton, zoo plankton and benthos • Fisheries • Diversity indices • Trophic levels • Rare and endangered species • Marine Parks/ Sanctuaries/ closed areas /coastal regulation zone (CRZ) **Terrestrial** • Vegetation-species list, economic importance, forest produce, medicinal value • Importance value index (IVI) of trees • Fauna • Avi fauna • Rare and endangered species • Sanctuaries / National park / Biosphere reserve • Migratory routes	• Detailed description of flora and fauna (terrestrial and aquatic) existing in the study area shall be given with special reference to rare, endemic and endangered species. Indicator species which indicate ecological and environment degradation should be identified and included to clearly state whether the proposed project would result in to any adverse effect on any species. • Samples to collect from upstream and downstream of discharge point, nearby tributaries at downstream, and also from dug wells close to activity site. • For forest studies, direction of wind should be considered while selecting forests. • Secondary data to collect from Government offices, NGOs, published literature.		
F. socio-economic			
• Demographic structure • Infrastructure resource base • Economic resource base • Health status: Morbidity pattern • Cultural and aesthetic attributes	• Socio-economic survey is based on proportionate, stratified and random sampling method. • Primary data collection through questionnaire • Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. Agencies		

Attributes	Sampling		Remarks
	Network	Frequency	
• Education			

iii. Interpretation of each environment attribute shall be enumeratedand summarized as given below:

- Ambient air quality
- Ambient Noise quality
- Surface water quality
- Ground water quality
- Soil quality
- Biological Environment
- Land use
- Socio-economic environment

4. Anticipated Environment Impacts and mitigation measures (In case of expansion, cumulative impact assessment shall be carried out)

i. Identification of potential impacts in the form of a **matrix** for the construction and operation phase for all the environment components

Activity	Environment	Ecological	Socio-economic
Construction phase			
Operation phase			

ii. Impact on ambient air quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase

b. Operation phase

- Details of stack emissions from the existing as well as proposed activity.
- Assessment of ground level concentration of pollutants from the stack emission based on AQIP Modelling The air quality contours shall be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any along with wind rose map for respective period
- Impact on ground level concentration, under normal, abnormal and emergency conditions. Measures to handle emergency situations in the event of uncontrolled release of emissions.

iii. Impact on ambient noise quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase

b. Operation phase

iv. Impact on traffic (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase

b. Operation phase

v. Impact on soil quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)

a. Construction phase
b. Operation phase

vi. Impact on land use (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)
a. Construction phase
b. Operation phase

vii. Impact on surface water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)
a. Construction phase
b. Operation phase

viii. Impact on ground water resource and quality (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)
a. Construction phase
b. Operation phase

ix. Impact on terrestrial and aquatic habitat (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)
a. Construction phase
b. Operation phase

x. Impact on socio-economic environment (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)
a. Construction phase
b. Operation phase

xi. Impact on occupational health and safety (Sources; Embedded control measures; Assessment; Mitigation measures; Residual impact)
a. Construction phase
b. Operation phase

5. Analysis of Alternatives (Technology & Site)

i. No project scenario
ii. Site alternative
iii. Technical and social concerns
iv. Conclusion

6. Environmental Monitoring Program

i. Details of the Environment Management Cell
ii. Performance monitoring schedule for all pollution control devices shall be furnished.
iii. Corporate Environment Policy

a. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
b. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environment or forest norms / conditions? If so, it may be detailed in the EIA.
c. What is the hierarchical system or Administrative order of the company to deal with the environment issues and for ensuring compliance with the environment clearance conditions? Details of this system may be given.

d. Does the company have system of reporting of non compliances / violations of environment norms to the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism shall be detailed in the EIA report

iv. Action plan for **post-project environment monitoring matrix**:

Activity	**Aspect**	**Monitoring Parameter**	**Location**	**Frequency**	**Responsibility**
Construction phase					
Operation phase					

7. Additional Studies

i. Public consultation details (Entire proceedings as separate annexurealong with authenticated English Translation of Public Consultation proceedings).
ii. Summary of issues raised during public consultation along with action plan to address the same as per MoEF&CC O.M. dated 30/09/2020

S	**Physical activity and action plan**		**Year of implementation (Budget in INR)**			**Total Expenditure (Rs. in Crores)**
	Name of the Activity	**Physical Targets**	**1st**	**2nd**	**3rd**	

iii. Risk assessment
- Methodology
- Hazard identification
- Frequency analysis
- Consequence analysis
- Risk assessment outcome

iv. Emergency response and preparedness plan

8. Project Benefits

i. Environment benefits
ii. Social infrastructure
iii. Employment and business opportunity
iv. Other tangible benefits

9. Environment Cost Benefit Analysis

i. Net present value
ii. Internal rate of return
iii. Benefit cost ratio
iv. Cost effectiveness analysis

10. Environment Management Plan (Construction and Operation phase)

i. Air quality management plan
ii. Noise quality management plan

iii. Solid and hazardous waste management plan
iv. Effluent management plan
v. Storm water management plan
vi. Rain water harvesting plan
vii. Occupational health and safety management plan
viii. Green belt development plan
ix. Socio-economic management plan
x. Wildlife conservation plan (In case of presence of schedule I species)
xi. Total capital cost and recurring cost/annum for environment pollution control measures shall be included.

11. Conclusion of the EIA study

12. In addition to the above, any litigation pending against the project and/or any direction/order passed by any Court of Law against the project, if so, details thereof shall also be included. Has the unit received any notice under the Section 5 of Environment (Protection) Act, 1986 or relevant Sections of Air and Water Acts? If so, details thereof and compliance/ATR to the notice(s) and present status of the case.

SPECIAL CONDITIONS-

1. For Large ISPs, a 3-D view i.e. DEM (Digital Elevation Model) for the area in 10 km radius from the proposal site. MRL details of project site and RL of nearby sources of water shall be indicated.
2. Plan for the implementation of the recommendations made for the steel plants in the CREP guidelines.
3. Plan for solid wastes utilization
4. Plan for utilization of energy in off gases (coke oven, blast furnace)
5. System of coke quenching adopted with justification.
6. Details on environmentally sound technologies for recycling of hazardous materials, as per CPCB Guidelines, may be mentioned in case of handling scrap and other recycled materials.
7. Details on toxic metal content in the waste material and its composition and end use (particularly of slag).
8. Details on toxic content (TCLP), composition and end use of slag.
9. 100 % dolo char generated in the plant shall be used to generate power.
10. Fourth Hole fume extraction system shall be provided for SAF.WHR system shall be installed to recover sensible heat from flue gases of EAF. Provision for installation of jigging and briquetting plant to utilise the fines generated in the process.
11. No tailing pond is permitted for Iron ore slimes. Dewatering and filtration system shall be provided.
12. Emission/effluent norms as per G.S.R 894 (E) dated 4/12/2019.

ACTIVITY 1(d)- THERMAL POWER PLANT

STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR THERMAL POWER PLANTS PROJECTS AND INFORMATION TO BEINCLUDED IN EIA/EMP REPORT

A. Statutory compliance

1. The proposed project shall be given a unique name in consonance with the name submitted to other Government Departments etc. for its better identification and reference.
2. Vision document specifying prospective long term plan of the project shall be formulated and submitted.
3. Latest compliance report duly certified by the Regional Office of MoEF&CC for the conditions stipulated in the environmental and CRZ clearances of the previous phase(s) for the expansion projects shall be submitted.

B. Details of the Project and Site

1. The project proponent needs to identify minimum three potential sites based on environmental, ecological and economic considerations, and choose one appropriate site having minimum impacts on ecology and environment. A detailed comparison of the sites in this regard shall be submitted.
2. Executive summary of the project indicating relevant details along with recent photographs of the proposed site (s) shall be provided. Response to the issues raised during Public Hearing and the written representations (if any), along with a time bound Action Plan and budgetary allocations to address the same, shall be provided in a tabular form, against each action proposed.
3. Harnessing solar power within the premises of the plant particularly at available roof tops and other available areas shall be formulated and for expansion projects, status of implementation shall also be submitted.
4. The geographical coordinates (WGS 84) of the proposed site (plant boundary), including location of ash pond along with topo sheet (1:50,000 scale) and IRS satellite map of the area, shall be submitted. Elevation of plant site and ash pond with respect to HFL of water body/nallah/River and high tide level from the sea shall be specified, if the site is located in proximity to them.
5. Layout plan indicating break-up of plant area, ash pond, green belt, infrastructure, roads etc. shall be provided.
6. Land requirement for the project shall be optimized and in any case not more than what has been specified by CEA from time to time. Item wise break up of land requirement shall be provided.
7. Present land use (including land class/kism) as per the revenue records and State Govt. records of the proposed site shall be furnished. Information on land to be

acquired including coal transportation system, laying of pipeline, ROW, transmission lines etc. shall be specifically submitted. Status of land acquisition and litigation, if any, should be provided.

8. If the project involves forest land, details of application, including date of application, area applied for, and application registration number, for diversion under FCA and its status should be provided along with copies of relevant documents.
9. The land acquisition and R&R scheme with a time bound Action Plan should be formulated and addressed in the EIA report.
10. Satellite imagery and authenticated topo sheet indicating drainage, cropping pattern, water bodies (wetland, river system, stream, nallahs, ponds etc.), location of nearest habitations (villages), creeks, mangroves, rivers, reservoirs etc. in the study area shall be provided.
11. Topography of the study area supported by toposheet on 1:50,000 scale of Survey of India, along with a large scale map preferably of 1:25,000 scale and the specific information whether the site requires any filling shall be provided. In that case, details of filling, quantity of required fill material; its source, transportation etc. shall be submitted.

C. Ecology biodiversity and Environment

1. A detailed study on land use pattern in the study area shall be carried out including identification of common property resources (such as grazing and community land, water resources etc.) available and Action Plan for its protection and management shall be formulated. If acquisition of grazing land is involved, it shall be ensured that an equal area of grazing land be acquired and developed and detailed plan submitted.
2. Location of any National Park, Sanctuary, Elephant/Tiger Reserve (existing as well as proposed), migratory routes / wildlife corridor, if any, within 10 km of the project site shall be specified and marked on the map duly authenticated by the Chief Wildlife Warden of the State or an officer authorized by him.
3. A mineralogical map of the proposed site (including soil type) and information (if available) that the site is not located on potentially mineable mineral deposit shall be submitted.
4. The water requirement shall be optimized (by adopting measures such as dry fly ash and dry bottom ash disposal system, air cooled condenser, concept of zero discharge) and in any case not more than that stipulated by CEA from time to time, to be submitted along with details of source of water and water balance diagram. Details of water balance calculated shall take into account reuse and re- circulation of effluents.
5. Water body/Nallah (if any) passing across the site should not be disturbed as far as possible. In case any Nallah / drain is proposed to be diverted, it shall be ensured that the diversion does not disturb the natural drainage pattern of the area. Details of proposed diversion shall be furnished duly approved by the concerned Department of the State.
6. It shall also be ensured that a minimum of 500 m distance of plant boundary is kept from the HFL of river system / streams etc. and the boundary of site should also be located 500 m away from railway track and National Highways.
7. Hydro-geological study of the area shall be carried out through an institute/ organization of repute to assess the impact on ground and surface water regimes. Specific mitigation measures shall be spelt out and time bound Action Plan for its implementation shall be submitted.
8. Detailed Studies on the impacts of the ecology including fisheries of the River/Estuary/Sea due to the proposed withdrawal of water / discharge of treated wastewater into the River/Sea etc shall be carried out and submitted along with the EIA Report. In case of requirement of marine impact assessment study, the location of intake and outfall shall be clearly specified along with depth of water drawl and discharge into open sea.
9. Source of water and its sustainability even in lean season shall be provided along with details of ecological impacts arising out of withdrawal of water and taking into account inter-state shares (if any). Information on other competing sources downstream of the proposed project and commitment regarding availability of requisite quantity of water from the Competent Authority shall be provided along with letter / document stating firm allocation of water.
10. Detailed plan for rainwater harvesting and its proposed utilization in the plant shall be furnished.In addition, wherever ground water is drawn, PP shall submit detailed plan of Water charging activity to be undertaken.
11. Feasibility of near zero discharge concept shall be critically examined and its details submitted.
12. Optimization of Cycles of Concentration (COC) along with other water conservation measures in the project shall be specified.
13. Plan for recirculation of ash pond water and its implementation shall be submitted.
14. Detailed plan for conducting monitoring of water quality regularly with proper maintenance of records shall be formulated. Detail of methodology and identification of monitoring points (between the plant and drainage in the direction of flow of surface / ground water) shall be submitted. It shall be ensured that parameter to be monitored also include heavy metals. A provision for long-term monitoring of ground water table using Piezometer shall be incorporated in EIA, particularly from the study area.
15. Hazards Characterization: Past incidents of hazard events within 10km radius of project area with detailed analysis of causes and probability of reoccurrence

D. Environmental Baseline study and mitigation measures

1. One complete season (critical season) site specific meteorological and AAQ data (except monsoon season) as per latest MoEF&CC Notification shall be collected along with past three year's meteorological data for that particular season for wins speed analysisand the dates of monitoring shall be recorded. The parameters to be

covered for AAQ shall include PM10, PM2.5, SO2, NOx, CO and Hg. The location of the monitoring stations should be so decided so as to take into consideration the upwind direction, pre-dominant downwind direction, other dominant directions, habitation and sensitive receptors. There should be at least one monitoring station each in the upwind and in the pre - dominant downwind direction at a location where maximum ground level concentration is likely to occur.

2. In case of expansion project, air quality monitoring data of 104 observations a year for relevant parameters at air quality monitoring stations as identified/stipulated shall be submitted to assess for compliance of AAQ Standards (annual average as well as 24 hrs).
3. A list of industries existing and proposed in the study area shall be furnished.
4. Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects on the environment of the area shall be assessed in detail. Details of the Model used and the input data used for modelling shall also be provided. The air quality contours should be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any. The windrose and isopleths should also be shown on the location map. The cumulative study should also include impacts on water, soil and socio-economics.
5. Radio activity and heavy metal contents of coal to be sourced shall be examined and submitted along with laboratory reports.
6. Fuel analysis shall be provided. Details of auxiliary fuel, if any, including its quantity, quality, storage etc should also be furnished.
7. Quantity of fuel required, its source and characteristics and documentary evidence to substantiate confirmed fuel linkage shall be furnished. The Ministry's Notification dated 02.01.2014 regarding ash content in coal shall be complied. For the expansion projects, the compliance of the existing units to the said Notification shall also be submitted
8. Details of transportation of fuel from the source (including port handling) to the proposed plant and its impact on ambient AAQ shall be suitably assessed and submitted. If transportation entails a long distance it shall be ensured that rail transportation to the site shall be first assessed. Wagon loading at source shall preferably be through silo/conveyor belt.
9. For proposals based on imported coal, inland transportation and port handling and rail movement shall be examined and details furnished. The approval of the Port and Rail Authorities shall be submitted.
10. Details regarding infrastructure facilities such as sanitation, fuel, restrooms, medical facilities, safety during construction phase etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase should be adequately catered for and details furnished.

E. Environmental Management Plan

1. EMP to mitigate the adverse impacts due to the project along with item - wise cost of its implementation in a time bound manner shall be specified.
2. A Disaster Management Plan (DMP) along with risk assessment study including fire and explosion issues due to storage and use of fuel should be prepared. It should take into account the maximum inventory of storage at site at any point of time. The risk contours should be plotted on the plant layout map clearly showing which of the proposed activities would be affected in case of an accident taking place. Based on the same, proposed safeguard measures should be provided. Measures to guard against fire hazards should also be invariably provided. Provision for mock drills shall be suitably incorporated to check the efficiency of the plans drawn.
3. The DMP so formulated shall include measures against likely Fires/Tsunami/Cyclones/Storm Surges/ Earthquakes etc, as applicable. It shall be ensured that DMP consists of both On-site and Off-site plans, complete with details of containing likely disaster and shall specifically mention personnel identified for the task. Smaller version of the plan for different possible disasters shall be prepared both in English and local languages and circulated widely.
4. Details of fly ash utilization plan as per the latest fly ash Utilization Notification of GOI along with firm agreements / MoU with contracting parties including other usages etc. shall be submitted. The plan shall also include disposal method / mechanism of bottom ash along with monitoring mechanism.

F. Green belt development

1. Detailed scheme for raising green belt of native species of appropriate width (50 to 100 m) and consisting of at least 3 tiers around plant boundary not less than 2000 tree per ha with survival rate of more than 85%shall be submitted. Photographic evidence must be created and submitted periodically including NRSA reports in case of expansion projects. A shrub layer beneath tree layer would serve as an effective sieve for dust and sink for CO2 and other gaseous pollutants and hence a stratified green belt should be developed.
2. Over and above the green belt, as carbon sink, plan for additional plantation shall be drawn by identifying blocks of degraded forests, in close consultation with the District Forests Department. In pursuance to this the project proponent shall formulate time bound Action Plans along with financial allocation and shall submit status of implementation to the Ministry every six months.

G. Socio-economic activities

1. Socio-economic study of the study area comprising of 10 km from the plant site shall be carried out through a reputed institute / agency which shall consist of detail assessment of the impact on livelihood of the local communities.
2. Action Plan for identification of local employable youth for training in skills, relevant to the project, for eventual employment in the project itself shall be formulated and numbers specified during construction & operation phases of the Project.

3. If the area has tribal population, it shall be ensured that the rights of tribals are well protected. The project proponent shall accordingly identify tribal issues under various provisions of the law of the land.
4. *A detailed CER plan along with activities wise break up of financial commitment shall be prepared in terms of the provisions OM No. 22-65/2017-IA.III dated 30.09.2020.CER component shall be identified considering need based assessment study and Public Hearing issues. Sustainable income generating measures which can help in upliftment of affected section of society, which is consistent with the traditional skills of the people shall be identified.*
5. *While formulating CER schemes it shall be ensured that an in-built monitoring mechanism for the schemes identified are in place and mechanism for conducting annual social audit from the nearest government institute of repute in the region shall be prepared. The project proponent shall also provide Action Plan for the status of implementation of the scheme from time to time and dovetail the same with any Govt. scheme(s). CERdetails done in the past should be clearly spelt out in case of expansion projects.*
6. R&R plan, as applicable, shall be formulated wherein mechanism for protecting the rights and livelihood of the people in the region who are likely to be impacted, is taken into consideration. R&R plan shall be formulated after a detailed census of population based on socio economic surveys who were dependant on land falling in the project, as well as, population who were dependant on land not owned by them.
7. Assessment of occupational health and endemic diseases of environmental origin in the study area shall be carried out and Action Plan to mitigate the same shall be prepared.
8. Occupational health and safety measures for the workers including identification of work related health hazards shall be formulated. The company shall engage full time qualified doctors who are trained in occupational health. Health monitoring of the workers shall be conducted at periodic intervals and health records maintained. Awareness programme for workers due to likely adverse impact on their health due to working in non-conducive environment shall be carried out and precautionary measures like use of personal equipments etc. shall be provided. Review of impact of various health measures undertaken at intervals of two to three years shall be conducted with an excellent follow up plan of action wherever required.

H. Corporate Environment Policy

1. Does the company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.
2. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.
3. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions. Details of this system may be given.
4. Does the company has compliance management system in place wherein compliance status along with compliances / violations of environmental norms are reported to the CMD and the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism should be detailed in the EIA report.

I. Miscellaneous

1. All the above details should be adequately brought out in the EIA report and in the presentation to the Committee.
2. Details of litigation pending or otherwise with respect to project in any Court, Tribunal etc. shall invariably be furnished.
3. In case any dismantling of old plants are envisaged, the planned land use & land reclamation of dismantled area to be furnished.

J. Additional TOR for Coastal Based Thermal Power Plants Projects (TPPs):

Over and above the TOR mentioned in Thermal Power Plants Projects, the following shall be strictly followed (as applicable):

1. Low lying areas fulfilling the definition wetland as per Ramsar Convention shall be identified and clearly demarcated w.r.t the proposed site.
2. If the site includes or is located close to marshy areas and backwaters, these areas must be excluded from the site and the project boundary should be away from the CRZ line. Authenticated CRZ map from any of the authorized agencies shall be submitted.
3. The soil levelling should be minimum with no or minimal disturbance to the natural drainage of the area. If the minor canals (if any) have to be diverted, the design for diversion should be such that the diverted canals not only drains the plant area but also collect the volume of flood water from the surrounding areas and discharge into marshy areas/major canals that enter into creek. Major canals should not be altered but their embankments should be strengthened and desilted.
4. Additional soil required for levelling of the sites should as far as possible be generated within the site itself in such a manner that the natural drainage system of the area is protected and improved.
5. Marshy areas which hold large quantities of flood water to be identified and shall not be disturbed.
6. No waste should be discharged into Creek, Canal systems, Backwaters, Marshy areas and seas without appropriate treatment. Wherever feasible, the outfall should be first treated in a Guard Pond and then only discharged into deep sea (10 to 15 m depth). Similarly, the Intake should be from deep sea to avoid aggregation of fish and in no case shall be from the estuarine zone. The brine that comes out from Desalinization Plants (if any) should not be discharged into sea without adequate dilution.

7. Mangrove conservation and regeneration plan shall be formulated and Action Plan with details of time bound implementation shall be specified, if mangroves are present in Study Area.
8. A common Green Endowment Fund should be created by the project proponents out of EMP budgets. The interest earned out of it should be used for the development and management of green cover of the area.
9. Impact on fisheries at various socio economic level shall be assessed.
10. An endowment Fishermen Welfare Fund should be created out of CER grants not only to enhance their quality of life by creation of facilities for Fish Landing Platforms / Fishing Harbour / cold storage, but also to provide relief in case of emergency situations such as missing of fishermen on duty due to rough seas, tropical cyclones and storms etc.
11. Tsunami Emergency Management Plan shall be prepared wherever applicable and Plan submitted prior to the commencement of construction work.
12. There should not be any contamination of soil, ground and surface waters (canals & village pond) with sea water in and around the project sites. In other words necessary preventive measures for spillage from pipelines, such as lining of Guard Pond used for the treatment of outfall before discharging into the sea and surface RCC channels along the pipelines of outfall and intake should be adopted. This is just because the areas around the projects boundaries could be fertile agricultural land used for paddy cultivation.

2(b):STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR MINERAL BENEFICIATION PROJECTS AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

1) The alternate sites considered, the relative merits and demerits and the reasons for selecting the proposed site for the Beneficiation Plant should be indicated.

2) Details of the technology and process involved for beneficiation should be given. .

3) Location of the proposed Plant w.r.t. the source of raw material and mode of transportations of the ore from mines to the beneficiation plant should be justified.

4) Treatment of run of mine (ROM) and or of the fines/waste dump should be spelt out.

5) Estimation of the fines going into the washings should be made and its management described.

6) Details of the equipment, settling pond etc. should be furnished.

7) Detailed material balance should be provided.

8) Sources of raw material and its transportation should be indicated. Steps proposed to be taken to protect the ore from getting air borne should be brought out.

9) Management and disposal of tailings and closure plan of the tailing pond, if any after the project is over, should be detailed in a quantified manner.

10) The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should also be indicated.

11) A copy of the document in support of the fact that the Proponent is the rightful lessee of the unit should be given.

12) All documents including EIA and public hearing should be compatible with one another in terms of the production levels, waste generation and its management and technology and should be in the name of the lessee.

13) All corner coordinates of the Unit, superimposed on a High Resolution Imagery/Toposheet should be provided. Such an Imagery of the proposed Unit should clearly show the land use and other ecological features of the study area (core and buffer zone).

14) It should be clearly indicated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of

environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large,may also be detailed in the EIA Report.

15) Issues relating to Safety should be detailed. The proposed safeguard measures in each case should also be provided. Disaster management plan shall be prepared and included in the EIA/EMP Report.

16) The study area will comprise of 10 km zone around the Plant.

17) Cumulative impact study of both Beneficiation Plant with suggested mitigation measures as per the study should be described.

18) Location of Railway siding with its handling capacity and safety measures should be indicated.

19) Option to provide only silo for storage of minerals instead of open stacking to avoid fugitive dust should be explored and arrangements finalized justified.

20) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

21) Details of the land for any Over Burden Dumps outside the lease, such as extent of land area, distance from lease, its land use, R&R issues, if any, should be given.

22) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the Project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

23) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.

24) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.

25) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

26) A study shall be got done to ascertain the impact of the Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly detailed mitigative measures required, should be worked out with cost implications and submitted.

27) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.

28) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

29) Proximity to Areas declared as 'Critically Polluted' shall also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB/CPCBshall be secured and furnished to the effect that the proposed activities could be considered.

30) Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the unit w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

31) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects, should be discussed in the report.

32) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the unit in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

33) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of

mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

34) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.

35) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be secured and copy furnished. .

36) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.

37) Impact of the project on the water quality, both surface and groundwater should be assessed and necessary safeguard measures, if any required, should be provided.

38) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.

39) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the project. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to the pollution.

40) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered.

41) Details of the onsite shelter and facilities to be provided to the workers should be included in the EIA report.

42) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area should be be detailed.

43) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

44) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

45) Public hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.

46) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the project should be given.

47) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

48) A brief background of the Project, its financial position, Group Companies and legal issues etc should be provided with past and current important litigations if any.

49) Benefits of the Project, if the project is implemented should be outlined. The benefits of the projects shall clearly indicate environmental, social, economic, employment potential, etc.

50) Besides the above, the below mentioned general points are also to be followed:-

a) All documents to be properly referenced with index and continuous page numbering.

b) Where data are presented in the report especially in Tables, the period in which the data were collected and the sources should be indicated.

c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the project.

d) Where the documents provided are in a language other than English, an English translation should be provided.

e) The Questionnaire for environmental appraisal of project as devised earlier by the Ministry shall also be filled and submitted.

f) While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should also be followed.

g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.

h) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certifiedReport of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project by the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.

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DAILY AVERAGE OF MICRO-METEOROLOGICAL MONITORED DATA (1 MARCH, 2022 TO 31 MAY, 2022)

DATE	CALM	<---------- DIRECTION WISE AVERAGE WIND SPEED (km/hr) EXCLUDING CALM ---------->																TEMP.	REL HUM	RAINFALL
	<1.8kmph	E	ENE	NE	NNE	N	NNW	NW	WNW	W	WSW	SW	SSW	S	SSE	SE	ESE	(°C)	(%)	(mm)
01/03/22	1.28	0.00	0.00	0.00	0.00	0.00	2.12	0.00	4.34	3.59	3.38	3.29	5.19	3.94	0.00	2.00	1.88	27.78	60.00	0.10
02/03/22	0.90	3.08	0.00	0.00	0.00	0.00	0.00	2.26	0.00	3.98	0.00	2.69	2.92	2.67	0.00	2.04	0.00	26.78	65.00	0.00
03/03/22	1.36	2.26	0.00	2.24	0.00	0.00	2.88	0.00	2.70	4.04	2.97	3.14	0.00	0.00	0.00	0.00	3.31	26.42	66.00	0.00
04/03/22	0.96	3.25	0.00	0.00	1.84	0.00	3.46	3.55	3.46	3.21	3.38	2.61	3.15	0.00	0.00	0.00	0.00	27.06	61.00	0.00
05/03/22	1.09	4.11	3.35	3.47	0.00	3.32	0.00	5.01	0.00	0.00	0.00	3.66	0.00	3.21	3.49	1.98	0.00	27.12	64.00	0.00
06/03/22	1.02	3.55	0.00	0.00	0.00	0.00	0.00	0.00	1.95	0.00	0.00	0.00	4.08	0.00	0.00	0.00	0.00	27.23	61.00	0.00
07/03/22	1.30	0.00	0.00	0.00	0.00	0.00	4.14	0.00	3.93	2.53	0.00	0.00	0.00	2.74	0.00	0.00	0.00	26.95	63.00	0.00
08/03/22	0.99	0.00	0.00	0.00	0.00	0.00	0.00	3.28	2.65	0.00	0.00	4.21	0.00	3.42	3.88	0.00	0.00	27.16	60.00	0.00
09/03/22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.22	3.81	5.25	4.51	0.00	0.00	27.11	58.00	0.00
10/03/22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.97	0.00	0.00	3.01	6.67	2.39	4.94	4.53	0.00	0.00	27.29	58.00	0.00
11/03/22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.39	3.87	4.18	4.40	0.00	0.00	27.78	59.00	0.00
12/03/22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.48	0.00	0.00	3.66	3.71	3.47	0.00	3.44	0.00	0.00	28.08	59.00	0.00
13/03/22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.34	0.00	0.00	0.00	6.94	0.00	7.45	3.26	0.00	0.00	27.75	55.00	0.00
14/03/22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.76	0.00	0.00	0.00	3.42	2.79	2.52	3.51	2.44	0.00	28.52	52.00	0.00
15/03/22	1.51	0.00	0.00	0.00	0.00	0.00	0.00	4.35	0.00	0.00	0.00	4.11	0.00	2.62	3.46	2.35	2.01	29.27	51.00	0.00
16/03/22	1.05	5.77	1.88	1.88	0.00	0.00	0.00	4.92	0.00	3.37	0.00	0.00	0.00	0.00	0.00	2.37	0.00	29.93	53.00	0.00
17/03/22	1.75	4.38	0.00	2.36	0.00	3.35	10.94	3.94	0.00	7.64	0.00	13.84	0.00	0.00	0.00	4.07	9.30	29.65	64.00	0.00
18/03/22	0.00	0.00	0.00	11.29	0.00	11.14	9.41	0.00	0.00	10.60	0.00	5.75	0.00	0.00	0.00	3.39	0.00	29.61	64.00	0.00
19/03/22	1.59	8.01	0.00	4.64	7.94	5.51	0.00	5.95	5.61	4.85	0.00	6.75	0.00	0.00	0.00	2.82	5.07	29.48	61.00	0.00
20/03/22	0.80	3.91	6.22	4.65	0.00	4.07	5.00	7.59	0.00	5.58	0.00	0.00	0.00	0.00	0.00	2.41	2.87	29.87	63.00	0.00
21/03/22	1.46	4.00	0.00	2.30	0.00	5.06	0.00	4.99	0.00	4.60	0.00	8.87	2.84	7.48	0.00	0.00	0.00	30.68	63.00	0.00
22/03/22	1.20	0.00	0.00	3.08	0.00	2.74	3.42	2.46	0.00	3.23	0.00	4.15	0.00	0.00	0.00	0.00	0.00	30.98	63.00	0.00
23/03/22	1.75	5.68	0.00	0.00	0.00	3.87	3.12	5.48	2.05	2.79	2.69	3.90	0.00	0.00	0.00	2.56	2.39	30.94	64.00	0.00
24/03/22	1.33	3.96	0.00	0.00	2.05	4.74	0.00	4.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.08	62.00	0.00
25/03/22	1.13	7.35	8.00	4.47	5.23	5.34	8.21	4.81	0.00	0.00	0.00	6.76	0.00	0.00	0.00	0.00	0.00	31.23	63.00	0.00
26/03/22	0.00	11.48	4.47	5.31	2.91	0.00	0.00	2.93	0.00	0.00	0.00	0.00	1.99	1.99	2.26	1.87	3.46	31.95	58.00	0.00
27/03/22	0.84	8.32	0.00	0.00	0.00	0.00	0.00	5.36	0.00	0.00	0.00	5.13	4.79	4.68	0.00	0.00	0.00	31.64	52.00	0.00
28/03/22	0.78	5.64	3.29	3.66	0.00	0.00	0.00	7.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.42	4.04	31.40	49.00	0.00
29/03/22	1.34	4.44	6.26	4.81	0.00	0.00	0.00	4.22	0.00	0.00	0.00	0.00	0.00	0.00	2.12	2.96	2.12	31.37	49.00	0.00
30/03/22	1.32	4.85	3.88	2.84	0.00	5.06	0.00	3.08	0.00	2.09	0.00	0.00	0.00	0.00	0.00	1.86	0.00	31.95	54.00	0.00
31/03/22	0.92	0.00	0.00	3.42	2.12	2.53	8.68	0.00	0.00	6.27	0.00	6.21	0.00	0.00	0.00	0.00	3.21	31.83	63.00	0.00
01/04/22	0.00	0.00	4.75	5.38	7.01	6.33	5.37	0.00	0.00	4.93	0.00	6.60	0.00	0.00	0.00	2.71	0.00	32.21	62.00	0.00
02/04/22	0.96	3.87	0.00	5.40	3.04	0.00	4.85	3.21	0.00	4.70	0.00	5.45	0.00	0.00	0.00	0.00	0.00	32.65	58.00	0.00
03/04/22	1.48	0.00	0.00	0.00	0.00	0.00	5.13	7.52	3.24	5.23	5.92	9.55	0.00	0.00	0.00	0.00	0.00	32.47	63.00	0.00
04/04/22	0.00	0.00	0.00	6.82	0.00	6.90	9.20	0.00	0.00	7.37	0.00	11.48	0.00	0.00	0.00	2.39	0.00	32.46	63.00	0.00
05/04/22	1.15	0.00	0.00	5.52	8.42	8.04	9.37	5.09	0.00	12.08	0.00	8.30	0.00	0.00	0.00	2.92	0.00	32.32	62.00	0.00
06/04/22	0.82	12.96	0.00	5.01	7.22	9.10	8.00	11.15	2.50	5.01	0.00	9.89	0.00	0.00	0.00	0.00	3.67	32.38	61.00	0.00
07/04/22	1.51	0.00	0.00	3.52	4.31	6.46	7.59	9.88	0.00	8.60	0.00	12.93	0.00	0.00	0.00	2.54	5.51	32.42	60.00	0.00
08/04/22	1.07	6.67	0.00	7.15	6.09	6.38	11.29	6.03	0.00	10.87	0.00	8.06	0.00	0.00	0.00	2.43	0.00	32.86	55.00	0.00
09/04/22	1.51	9.14	9.03	4.43	3.21	6.74	0.00	5.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.54	2.57	33.46	55.00	0.00
10/04/22	0.00	6.12	5.03	5.40	2.99	5.00	0.00	7.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.38	0.00	33.53	53.00	0.00
11/04/22	0.00	7.00	0.00	4.57	4.25	7.96	0.00	5.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.10	0.00	34.05	52.00	0.00
12/04/22	1.33	8.52	6.46	3.90	2.19	9.81	0.00	6.25	0.00	0.00	0.00	6.62	0.00	2.70	0.00	2.28	0.00	33.86	53.00	0.00
13/04/22	1.69	7.03	0.00	5.06	6.29	7.90	5.30	9.09	0.00	3.07	0.00	9.68	0.00	0.00	0.00	2.80	0.00	34.25	54.00	0.00
14/04/22	0.00	14.64	4.23	5.52	4.26	6.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.62	0.00	35.01	50.00	0.00
15/04/22	1.67	12.12	5.07	5.38	0.00	0.00	0.00	6.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.68	2.43	35.33	48.00	0.00
16/04/22	0.00	12.88	6.66	6.80	3.83	11.63	0.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	34.60	51.00	0.00
17/04/22	1.51	9.75	7.94	7.11	5.06	10.39	0.00	8.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.60	52.00	0.00

DAILY AVERAGE OF MICRO-METEOROLOGICAL MONITORED DATA (1 MARCH, 2022 TO 31 MAY, 2022)

DATE	CALM	<---------- DIRECTION WISE AVERAGE WIND SPEED (km/hr) EXCLUDING CALM ---------->																TEMP.	REL HUM	RAINFALL
	<1.8kmph	E	ENE	NE	NNE	N	NNW	NW	WNW	W	WSW	SW	SSW	S	SSE	SE	ESE	(°C)	(%)	(mm)
18/04/22	1.09	5.44	3.32	6.58	4.63	0.00	7.49	7.58	0.00	6.12	0.00	4.86	0.00	4.48	0.00	2.69	0.00	35.05	50.00	0.00
19/04/22	1.38	8.93	0.00	3.42	0.00	12.65	0.00	9.73	3.72	2.90	0.00	0.00	0.00	0.00	0.00	1.80	4.04	34.36	55.00	0.00
20/04/22	0.00	6.48	0.00	4.48	5.17	6.67	5.58	3.68	5.09	14.22	6.48	14.31	2.09	0.00	0.00	4.17	6.91	34.81	55.00	0.00
21/04/22	0.00	0.00	0.00	10.21	0.00	9.70	17.51	0.00	0.00	12.56	0.00	13.00	0.00	0.00	0.00	3.75	0.00	34.17	59.00	0.50
22/04/22	0.00	3.14	7.63	0.00	0.00	0.00	9.10	9.79	0.00	6.29	0.00	10.33	0.00	0.00	0.00	2.35	4.07	34.65	55.00	0.00
23/04/22	1.71	3.23	0.00	2.33	0.00	4.85	0.00	7.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.39	2.85	35.53	47.00	0.00
24/04/22	0.00	3.63	2.22	3.67	3.39	0.00	0.00	10.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.10	3.35	35.55	48.00	0.00
25/04/22	0.00	5.81	3.68	4.28	3.74	0.00	0.00	7.52	0.00	0.00	0.00	7.32	0.00	0.00	0.00	2.86	0.00	35.45	45.00	0.00
26/04/22	1.20	4.82	3.76	2.77	0.00	8.27	0.00	7.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.24	0.00	35.62	47.00	0.00
27/04/22	1.34	8.38	2.12	3.27	0.00	3.21	0.00	7.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.62	0.00	35.36	50.00	0.00
28/04/22	1.78	5.94	0.00	5.43	2.80	6.80	0.00	7.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.92	0.00	35.76	49.00	0.00
29/04/22	1.44	5.13	2.70	6.04	3.64	9.71	0.00	8.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.29	2.74	36.01	48.00	0.00
30/04/22	0.00	6.64	6.71	5.85	0.00	6.09	8.45	7.80	0.00	10.01	0.00	7.62	0.00	0.00	0.00	0.00	0.00	35.44	53.00	0.00
01/05/22	0.00	0.00	0.00	8.89	0.00	8.41	13.03	0.00	0.00	10.80	0.00	13.27	0.00	0.00	0.00	0.00	10.30	34.68	55.00	0.00
02/05/22	0.00	4.80	5.95	5.66	0.00	0.00	0.00	6.67	0.00	6.94	0.00	11.29	0.00	0.00	0.00	3.64	7.87	34.67	55.00	0.30
03/05/22	1.29	0.00	0.00	12.38	9.06	3.29	14.98	0.00	0.00	11.10	0.00	9.72	0.00	0.00	0.00	4.52	0.00	34.87	58.00	0.60
04/05/22	0.00	9.27	12.07	10.50	10.71	0.00	7.22	6.35	0.00	12.03	0.00	6.50	0.00	0.00	0.00	4.09	0.00	35.04	57.00	0.30
05/05/22	0.00	7.70	0.00	0.00	0.00	0.00	0.00	0.00	7.89	11.61	0.00	8.28	8.25	7.51	0.00	4.40	4.15	34.62	57.00	0.60
06/05/22	1.25	0.00	0.00	0.00	0.00	0.00	0.00	9.58	6.67	7.38	2.95	8.29	3.70	4.96	4.14	3.71	5.42	34.41	54.00	0.10
07/05/22	1.64	0.00	0.00	0.00	0.00	0.00	10.09	0.00	4.51	3.25	0.00	9.85	0.00	4.46	0.00	3.85	6.47	34.37	55.00	0.00
08/05/22	1.69	0.00	0.00	5.20	0.00	6.54	2.78	0.00	3.88	11.16	3.07	8.09	0.00	0.00	0.00	5.70	0.00	33.80	57.00	0.00
09/05/22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.29	0.00	0.00	0.00	0.00	0.00	0.00	3.90	0.00	32.63	60.00	0.00
10/05/22	0.00	0.00	0.00	0.00	0.00	10.81	10.54	0.00	10.87	9.28	0.00	13.96	0.00	0.00	0.00	4.06	14.06	31.92	66.00	10.00
11/05/22	1.66	0.00	0.00	0.00	0.00	0.00	11.94	0.00	0.00	10.61	0.00	11.62	0.00	0.00	0.00	0.00	12.54	31.95	66.00	3.10
12/05/22	0.00	0.00	0.00	12.14	11.46	11.20	11.68	0.00	0.00	10.92	0.00	12.67	0.00	0.00	0.00	4.20	0.00	32.33	66.00	2.30
13/05/22	0.00	6.76	10.69	9.45	10.19	7.80	18.98	15.96	0.00	11.33	0.00	17.04	0.00	0.00	0.00	4.77	0.00	33.81	62.00	0.00
14/05/22	1.51	10.30	0.00	9.18	8.89	8.02	0.00	13.15	0.00	12.63	0.00	17.89	0.00	0.00	0.00	4.84	0.00	34.68	60.00	0.00
15/05/22	0.00	0.00	0.00	11.00	10.65	13.58	13.17	14.52	0.00	12.45	0.00	17.11	0.00	0.00	0.00	3.81	0.00	34.23	63.00	0.80
16/05/22	0.00	0.00	0.00	10.34	14.33	16.21	11.22	0.00	11.26	12.17	0.00	14.01	0.00	0.00	0.00	4.27	15.18	33.03	66.00	21.80
17/05/22	0.00	4.51	0.00	7.36	6.25	5.73	10.94	3.46	0.00	9.42	0.00	12.44	0.00	0.00	0.00	2.10	0.00	33.48	65.00	10.20
18/05/22	0.00	0.00	0.00	7.54	9.37	6.72	9.10	0.00	0.00	5.96	0.00	8.49	0.00	0.00	0.00	2.59	0.00	31.71	71.00	10.20
19/05/22	0.00	6.80	7.08	7.00	6.09	7.00	0.00	8.45	0.00	9.88	0.00	0.00	0.00	0.00	0.00	2.64	0.00	33.22	65.00	2.00
20/05/22	0.00	12.31	9.50	5.75	5.44	11.60	0.00	11.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.84	0.00	34.80	58.00	0.00
21/05/22	0.00	0.00	11.32	8.38	0.00	0.00	0.00	9.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.61	0.00	35.49	57.00	0.00
22/05/22	1.20	3.08	0.00	5.54	5.66	0.00	0.00	0.00	0.00	5.47	5.75	9.59	8.00	6.67	0.00	1.98	3.04	34.74	54.00	0.00
23/05/22	1.09	6.74	0.00	4.24	0.00	0.00	9.17	9.71	2.95	6.35	0.00	7.99	0.00	0.00	0.00	3.03	6.12	34.65	57.00	0.00
24/05/22	0.61	0.00	0.00	0.00	0.00	0.00	7.68	0.00	9.82	7.67	0.00	5.60	0.00	0.00	0.00	3.85	0.00	33.50	59.00	0.00
25/05/22	0.00	5.05	0.00	5.23	4.72	5.68	8.96	9.11	0.00	0.00	0.00	8.36	2.80	2.16	2.69	2.71	0.00	33.94	56.00	0.00
26/05/22	0.78	2.29	0.00	4.62	3.05	0.00	0.00	4.85	2.95	3.56	4.10	3.70	0.00	0.00	0.00	2.96	0.00	34.09	56.00	0.00
27/05/22	0.00	6.66	3.15	3.82	4.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.66	0.00	35.18	52.00	0.00
28/05/22	1.42	0.00	0.00	0.00	0.00	0.00	0.00	9.29	0.00	0.00	0.00	0.00	0.00	4.38	6.56	2.37	3.37	35.76	51.00	0.00
29/05/22	1.18	2.84	1.81	0.00	0.00	0.00	0.00	9.15	0.00	0.00	0.00	6.69	0.00	3.96	0.00	2.45	0.00	36.14	51.00	0.00
30/05/22	1.50	2.05	0.00	0.00	0.00	0.00	0.00	10.02	0.00	2.39	0.00	9.56	5.89	7.08	0.00	0.00	2.67	35.83	53.00	0.00
31/05/22	1.20	0.00	0.00	0.00	0.00	9.92	0.00	5.31	3.35	9.88	2.26	4.73	2.09	2.39	0.00	4.18	0.00	35.23	53.00	0.00

Note: The above daily average have been arrived after processing the hourly readings monitored by Automatic Weather Station

Min Mec R&D Laboratory
(A DIVISION OF MIN MEC CONSULTANCY PVT. LTD.)
A-121, Paryavaran Complex, IGNOU Road, New Delhi – 110 030
Phone: 29532236, 29535891, 29532568
Email: lab.minmec@gmail.com; Visit us at :http://www.minmec.com
Recognised by MOEF&CC (Sl.No.97 of S.O.3744(E) dated 17/10/2019)

ANNEXURE : II Contd..

TEST REPORT

Customer's Name & Address

Rungta Mines Ltd. (Ferro Alloys Division)
Vill.- Tulasidiha, P.O.- Meramandali
Dist.- Dhenkanal, Odisha- 759121

Contact Person: Mr. G. P. Sharma, Phone: 06582-256861

Sample Particulars		
Type of Sample	:	Micro meteorology
Work Order No.	:	4800028086
Sampling Location	:	In and around Expansion of Ferro Alloys Plant, Odisha
Sampling Procedure	:	Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.12.2020
Sample Volume/ Quantity	:	Not Applicable
Sampling Team	:	MMRDL (Gaurav)
Sample Reg. No	:	MMMET/04-23/1.1
Date(s) of Sampling	:	01/04/2023 to 08/04/2023
Date(s) of Receipt	:	25/04/2023
Date(s) of Processing	:	27/04/2023
Date of Report	:	28/04/2023
Test Report No.	:	MMMET/04-23/20
Page	:	1 of 2

OBSERVATION OF SOLAR RADIANT EXPOSURE (W/m^2)

Date→	01/04/23	02/04/23	03/04/23	04/04/23	05/04/23	06/04/23	07/04/23	08/04/23
6:00 hrs	14.58	8.75	5.83	11.67	17.50	8.75	8.75	8.75
7:00 hrs	110.83	99.17	93.33	119.58	107.92	90.42	113.75	90.42
8:00 hrs	285.83	265.42	300.42	329.58	280.00	317.92	320.83	282.92
9:00 hrs	492.92	492.92	551.25	568.75	466.67	539.58	522.08	466.67
10:00 hrs	694.17	700.00	732.08	758.33	656.25	729.17	688.33	653.33
11:00 hrs	834.17	828.33	807.92	880.83	828.33	863.33	822.50	825.42
12:00 hrs	936.25	901.25	877.92	930.42	892.50	927.50	918.75	886.67
13:00 hrs	953.75	915.83	851.67	883.75	895.42	910.00	910.00	910.00
14:00 hrs	857.50	831.25	746.67	851.67	825.42	810.83	863.33	845.83
15:00 hrs	723.33	667.92	589.17	714.58	662.08	644.58	723.33	714.58
16:00 hrs	545.42	495.83	431.67	457.92	364.58	463.75	533.75	455.00
17:00 hrs	306.25	256.67	245.00	271.25	195.42	274.17	309.17	271.25
18:00 hrs	102.08	75.83	93.33	96.25	75.83	107.92	96.25	90.42
19:00 hrs	8.75	5.83	5.83	8.75	8.75	14.58	17.50	8.75
Daily sum	6865.83	6545.00	6332.08	6883.33	6276.67	6702.50	6848.33	6510.00

Average : 6620.47 W/m^2

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Test Report No. : MMMET/04-23/20

ANNEXURE : II Contd..

OBSERVATION OF AMOUNT OF CLOUDS (IN OCTAS)

Day	6:00 hrs	9:00 hrs	12:00 hrs	15:00 hrs	18:00 hrs	21:00 hrs
01/04/23	1	1	1	0	2	2
02/04/23	2	2	2	3	3	3
03/04/23	2	3	3	3	2	3
04/04/23	1	1	0	0	2	3
05/04/23	4	4	5	4	3	3
06/04/23	2	2	1	2	2	2
07/04/23	1	1	0	1	2	3
08/04/23	2	2	2	3	3	2

Prepared by

Rashmi Gupta
Administrative Manager

Checked by

Dr. Marisha Sharma
Authorised Signatory

- end of report -

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ANNEXURE : III

Customer's Name & Address

Rungta Mines Ltd. (Ferro Alloys Division)
Village - Tulasidiha, P.O.- Meramandali
Dist.- Dhenkanal, Odisha-759121

Contact Person: Mr. G. P. Sharma, Phone: 06582-256861

Sample Particulars		
Type of Sample	:	Ambient Air
Work Order No.	:	4800028086
Sampling Location	:	In and around Expansion of Ferro Alloys Plant, Odisha
Sampling Procedure	:	Section 3.0, of FWIM, dated 15.12.2020
Sample Duration	:	24 hours
Sampling Team	:	MMRDL (Gaurav)
Sample Reg. No	:	MMA/22/S4L1, L2, L3, L4, L5, L6, L7, L8/01-24
Date(s) of Sampling	:	01/03/2022 to 31/05/2022
Date(s) of Receipt	:	17/03/2022 to 03/06/2022
Date(s) of Testing	:	19/03/2022 to 06/06/2022
Date of Report	:	06/06/2022
Test Report No.	:	MMA/06-22/15
ULR No.	:	TC633722000000082F
Page	:	1 of 3

TEST REPORT

Sl. No.	Location →	Existing Plant area (Admin Building)					Bhanuparha Village					Gandijhara Village				
	Date of sampling↓	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	NH_3 µg/m³	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	NH_3 µg/m³	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	NH_3 µg/m³
1	1 - 02-03-2022	64.4	35.4	13.6	14.3	-	59.2	33.9	9.5	17.7	-	61.4	33.0	11.3	12.7	-
2	4 - 05-03-2022	62.3	34.3	10.5	16.8	-	53.9	28.8	8.2	17.2	-	56.5	30.0	13.6	12.3	-
3	9 - 10-03-2022	66.1	38.9	13.1	15.6	BDL	62.0	34.6	10.0	18.1	BDL	59.4	34.4	11.5	12.3	BDL
4	12 - 13-03-2022	67.8	37.9	11.8	16.0	BDL	50.2	28.4	8.2	16.8	BDL	58.7	32.5	11.3	10.3	BDL
5	16 - 17-03-2022	60.4	34.4	11.0	18.5	-	51.7	29.5	BDL	13.1	-	55.6	33.8	11.8	14.8	-
6	19 - 20-03-2022	67.2	36.8	13.9	17.7	-	51.8	29.7	6.4	11.5	-	57.0	30.5	12.5	13.1	-
7	24 - 25-03-2022	64.1	37.6	15.9	18.5	-	57.2	32.6	12.0	14.8	-	57.8	33.0	9.5	12.3	-
8	27 - 28-03-2022	65.8	35.1	16.2	18.5	-	55.4	30.4	12.3	13.5	-	58.7	33.5	13.3	14.4	-
9	1 - 02-04-2022	64.2	36.4	12.2	17.9	-	52.5	30.8	8.4	14.5	-	60.7	33.8	11.2	8.4	-
10	4 - 05-04-2022	61.1	33.7	9.4	20.2	-	50.8	27.5	6.6	14.8	-	63.3	37.6	14.0	15.2	-
11	9 - 10-04-2022	67.4	35.9	11.0	16.4	-	61.1	37.2	6.9	16.4	-	56.3	30.7	10.7	14.5	-
12	12 - 13-04-2022	64.0	35.5	14.5	19.4	-	60.0	33.0	BDL	15.6	-	62.8	36.6	13.5	12.6	-
13	16 - 17-04-2022	62.5	36.4	14.0	16.0	BDL	61.2	32.7	9.4	13.0	BDL	60.6	33.8	11.5	11.0	BDL
14	19 - 20-04-2022	67.8	41.6	13.8	17.6	BDL	51.7	28.3	7.6	15.2	BDL	55.8	30.1	13.5	14.5	BDL
15	24 - 25-04-2022	60.9	33.8	15.3	17.9	-	60.3	32.2	8.6	13.3	-	64.0	37.2	10.7	14.1	-
16	27 - 28-04-2022	60.7	33.3	10.5	19.1	-	60.2	34.2	BDL	18.3	-	57.8	33.0	12.7	14.1	-
17	1 - 02-05-2022	62.5	37.5	11.9	14.9	BDL	61.8	34.9	8.3	14.5	BDL	57.0	33.1	8.3	14.1	BDL
18	4 - 05-05-2022	62.9	35.0	10.7	15.2	BDL	54.2	32.1	6.6	10.6	BDL	56.1	29.7	9.7	15.7	BDL
19	9 - 10-05-2022	65.1	36.7	14.8	15.7	-	58.6	33.5	7.3	18.0	-	60.8	32.4	8.7	15.6	-
20	12 - 13-05-2022	65.3	35.8	10.9	14.5	-	56.1	32.2	7.8	12.9	-	57.2	32.6	11.9	13.7	-
21	17 - 18-05-2022	66.5	39.1	14.1	15.3	-	58.0	32.2	9.7	18.4	-	61.3	36.3	9.2	12.1	-
22	20 - 21-05-2022	67.9	37.2	10.5	16.5	-	61.6	35.8	11.6	12.1	-	62.1	35.8	12.1	13.3	-
23	25 - 26-05-2022	65.1	34.7	14.3	19.6	-	51.6	27.5	9.0	14.5	-	58.0	34.9	8.7	14.9	-
24	28 - 29-05-2022	60.6	34.6	9.2	16.9	-	57.6	31.2	6.1	11.8	-	55.2	30.4	12.6	12.1	-
	Minimum	**60.4**	**33.3**	**9.2**	**14.3**	**-**	**50.2**	**27.5**	**BDL**	**10.6**	**-**	**55.2**	**29.7**	**8.3**	**8.4**	**-**
	Maximum	**67.9**	**41.6**	**16.2**	**20.2**	**-**	**62.0**	**37.2**	**12.3**	**18.4**	**-**	**64.0**	**37.6**	**14.0**	**15.7**	**-**
	Average	**64.3**	**36.2**	**12.6**	**17.0**	**-**	**56.6**	**31.8**	**8.2**	**14.9**	**-**	**58.9**	**33.3**	**11.4**	**13.3**	**-**
	98 percentile	**67.9**	**40.5**	**16.0**	**19.9**	**-**	**61.9**	**36.6**	**12.2**	**18.4**	**-**	**63.7**	**37.4**	**13.8**	**15.7**	**-**

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Test Report No. : MMA/06-22/15
ULR No. : TC633722000000082F

ANNEXURE : III Contd..

Sl. No.	Location →	Chararhagarhia Village					Jharhabandh Village					Naraharipur Shasan Village				
	Date of sampling↓	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	NH_3 µg/m³	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	NH_3 µg/m³	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	NH_3 µg/m³
1	2 - 03-03-2022	48.7	26.7	8.2	12.3	-	57.0	33.1	7.2	8.6	-	54.8	32.2	7.7	10.3	-
2	5 - 06-03-2022	52.3	29.6	7.7	11.9	-	56.0	31.2	8.4	11.1	-	44.7	25.8	6.4	7.8	-
3	10 - 11-03-2022	51.8	30.5	7.4	9.9	BDL	61.5	33.8	9.5	12.7	BDL	48.0	27.5	6.4	9.0	BDL
4	13 - 14-03-2022	53.8	29.6	11.3	12.3	BDL	58.6	32.4	9.5	11.9	BDL	47.7	27.1	7.7	9.0	BDL
5	17 - 18-03-2022	57.7	32.9	10.0	11.9	-	52.9	30.6	10.3	10.7	-	50.8	29.1	6.4	8.6	-
6	20 - 21-03-2022	48.2	27.8	10.2	14.8	-	45.1	25.8	6.9	11.9	-	40.1	23.4	8.2	9.9	-
7	25 - 26-03-2022	53.3	31.2	9.7	11.5	-	59.6	33.9	11.3	11.9	-	51.9	30.0	7.2	8.2	-
8	28 - 29-03-2022	52.7	29.2	7.7	14.3	-	62.7	35.1	10.2	10.7	-	51.9	30.2	6.2	10.3	-
9	2 - 03-04-2022	53.3	29.7	13.2	14.1	-	52.8	30.2	11.2	11.8	-	45.5	25.9	6.4	9.5	-
10	5 - 06-04-2022	55.2	32.5	8.9	13.3	-	46.6	26.2	10.2	13.0	-	48.8	28.3	7.6	8.0	-
11	10 - 11-04-2022	60.2	30.4	10.4	14.9	BDL	56.8	33.3	7.9	9.9	BDL	47.5	28.0	6.4	8.8	BDL
12	13 - 14-04-2022	54.0	31.3	13.2	14.1	BDL	47.4	25.8	11.2	12.6	BDL	38.2	22.9	6.9	9.2	BDL
13	17 - 18-04-2022	55.8	30.9	7.9	9.1	-	55.9	30.9	11.2	11.8	-	47.2	27.9	6.4	10.3	-
14	20 - 21-04-2022	53.8	29.7	13.5	15.3	-	56.7	32.5	7.6	10.7	-	42.7	25.4	7.4	7.6	-
15	25 - 26-04-2022	56.4	32.1	10.4	11.4	-	51.8	28.3	8.4	11.4	-	52.5	31.7	7.9	10.3	-
16	28 - 29-04-2022	51.0	30.9	9.2	14.5	-	47.5	27.2	10.7	11.4	-	41.7	25.9	BDL	10.3	-
17	2 - 03-05-2022	51.9	28.0	12.1	12.5	-	50.4	30.1	12.6	12.9	-	42.3	23.8	BDL	9.0	-
18	5 - 06-05-2022	55.1	29.3	11.4	12.9	-	59.2	34.2	10.7	12.9	-	52.3	30.3	6.6	7.8	-
19	10 - 11-05-2022	54.3	30.6	9.7	14.1	-	58.4	34.7	7.0	11.8	-	41.4	25.0	7.5	10.2	-
20	13 - 14-05-2022	57.4	30.9	8.0	14.5	BDL	58.3	31.4	10.2	12.5	BDL	39.5	23.4	8.3	9.4	BDL
21	18 - 19-05-2022	53.8	31.3	11.9	12.5	BDL	62.2	37.2	12.4	12.5	BDL	48.8	30.5	8.5	8.6	BDL
22	21 - 22-05-2022	52.7	30.1	11.9	13.3	-	49.7	29.1	9.2	12.5	-	42.6	24.6	8.0	10.2	-
23	26 - 27-05-2022	51.6	28.7	13.4	14.9	-	45.1	25.0	7.3	11.7	-	38.9	22.8	6.1	8.2	-
24	29 - 30-05-2022	55.6	30.5	12.4	12.5	-	49.5	26.6	9.7	12.5	-	46.6	27.2	7.5	8.6	-
Minimum		**48.2**	**26.7**	**7.4**	**9.1**	**-**	**45.1**	**25.0**	**6.9**	**8.6**	**-**	**38.2**	**22.8**	**BDL**	**7.6**	**-**
Maximum		**60.2**	**32.9**	**13.5**	**15.3**	**-**	**62.7**	**37.2**	**12.6**	**13.0**	**-**	**54.8**	**32.2**	**8.5**	**10.3**	**-**
Average		**53.8**	**30.2**	**10.4**	**13.0**	**-**	**54.2**	**30.8**	**9.6**	**11.7**	**-**	**46.1**	**27.0**	**7.0**	**9.1**	**-**
98 percentile		**59.1**	**32.7**	**13.4**	**15.1**	**-**	**62.5**	**36.2**	**12.5**	**12.9**	**-**	**53.7**	**32.0**	**8.4**	**10.3**	**-**

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Test Report No. : MMA/06-22/15
ULR No. : TC633722000000082F

ANNEXURE : III Contd..

Sl. No.	Location →	Meramundali Bazar					Motanga Village				
	Date of sampling↓	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	NH_3 µg/m³	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	NH_3 µg/m³
1	3 - 04-03-2022	56.6	30.5	15.1	19.3	-	49.9	26.3	10.3	15.6	-
2	6 - 07-03-2022	56.2	31.8	11.3	21.4	-	49.0	29.1	9.5	10.3	-
3	11 - 12-03-2022	62.0	36.3	12.8	16.4	BDL	58.9	35.1	11.0	13.1	BDL
4	14 - 15-03-2022	60.2	34.9	9.7	21.3	BDL	49.8	28.5	8.7	14.8	BDL
5	18 - 19-03-2022	61.6	34.6	9.8	16.4	-	56.4	34.1	14.4	14.8	-
6	21 - 22-03-2022	53.9	28.7	11.3	15.6	-	52.9	30.4	14.3	16.8	-
7	26 - 27-03-2022	61.4	33.5	13.3	20.9	-	53.2	29.3	9.7	16.0	-
8	29 - 30-03-2022	55.3	31.3	15.4	20.9	-	53.4	31.4	13.6	14.4	-
9	3 - 04-04-2022	59.9	32.9	9.7	17.5	-	48.3	28.0	10.7	12.9	-
10	6 - 07-04-2022	54.3	28.7	13.5	20.2	-	56.1	32.5	6.4	13.7	-
11	11 - 12-04-2022	53.3	30.7	13.0	18.7	BDL	56.9	31.8	11.5	16.0	BDL
12	14 - 15-04-2022	55.7	33.3	10.2	20.5	BDL	60.0	35.0	14.0	16.0	BDL
13	18 - 19-04-2022	60.2	34.6	13.5	22.1	-	56.5	31.7	10.7	18.3	-
14	21 - 22-04-2022	56.6	33.8	12.0	19.1	-	49.9	27.6	7.6	13.3	-
15	26 - 27-04-2022	54.6	32.9	14.2	18.3	-	53.1	30.0	9.9	14.9	-
16	29 - 30-04-2022	53.8	31.3	15.5	19.0	-	52.1	29.1	12.0	16.4	-
17	3 - 04-05-2022	60.9	34.7	11.6	20.3	BDL	55.1	33.0	8.3	17.2	BDL
18	6 - 07-05-2022	58.0	32.1	14.6	19.6	BDL	51.4	27.4	7.8	18.0	BDL
19	11 - 12-05-2022	57.4	33.7	10.5	19.6	-	51.3	30.9	9.5	9.4	-
20	14 - 15-05-2022	61.2	34.5	12.6	15.7	-	54.9	33.7	11.2	12.9	-
21	19 - 20-05-2022	60.8	33.4	13.3	19.5	-	58.9	31.2	10.0	16.1	-
22	22 - 23-05-2022	53.9	28.8	13.8	18.0	-	51.3	29.6	12.1	14.9	-
23	27 - 28-05-2022	60.1	33.8	10.5	18.4	-	51.9	31.8	11.9	12.6	-
24	30 - 31-05-2022	61.4	35.1	12.6	18.0	-	49.6	26.7	10.9	15.3	-
Minimum		**53.3**	**28.7**	**9.7**	**15.6**	**-**	**48.3**	**26.3**	**6.4**	**9.4**	**-**
Maximum		**62.0**	**36.3**	**15.5**	**22.1**	**-**	**60.0**	**35.1**	**14.4**	**18.3**	**-**
Average		**57.9**	**32.7**	**12.5**	**19.0**	**-**	**53.4**	**30.6**	**10.7**	**14.7**	**-**
98 percentile		**61.8**	**35.7**	**15.5**	**21.7**	**-**	**59.5**	**35.1**	**14.3**	**18.2**	**-**

Parameter	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	SO_2 (µg/m³)	NO_2 (µg/m³)	NH_3 (µg/m³)
Protocol of Measurement	IS:5182 (Part 23) : 2006, RA 2017	Lab SOP/09/6 Issue 03 : 2017	IS:5182 (Part 2) : 2001, RA 2017	IS:5182 (Part 6) : 2006, RA 2017	IS 5182 (Part 25) : 2018
National Ambient Air Quality Standards (2009) for Concentration in Ambient Air for Industrial, Residential, Rural & Other areas.	100 (24 hours)	60 (24 hours)	80 (24 hours)	80 (24 hours)	400 (24 hours)

Note: BDL (Below Detection Limit) of NH_3<20 µg/m³.
FWIM: Field Work instruction Manual

Prepared by

Rashmi Gupta
Administrative Manager

Checked by

Dr. Marisha Sharma
Authorised Signatory

- end of report –

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Recognised by MOEF&CC (Sl.No.97 of S.O.3744(E) dated 17/10/2019)

ANNEXURE : III Contd..

Customer's Name & Address

Rungta Mines Ltd. (Ferro Alloys Division)
Village - Tulasidiha, P.O.- Meramandali
Dist.- Dhenkanal, Odisha- 759121

Contact Person: Mr. G. P. Sharma, Phone: 06582-256861

Sample Particulars		
Type of Sample	:	Ambient Air
Work Order No.	:	4800028086
Sampling Location	:	In and around Expansion of Ferro Alloys Plant, Odisha
Sampling Procedure	:	Section 3.0, of FWIM, dated 15.12.2020
Sample Duration	:	24 hours and Instant reading for CO
Sampling Team	:	MMRDL (Gaurav)
Sample Reg. No	:	MMA/22/S4L1, L2, L3, L4, L5, L6, L7, L8/01-24
Date(s) of Sampling	:	01/03/2022 to 31/05/2022
Date(s) of Receipt	:	17/03/2022 to 03/06/2022
Date(s) of Testing	:	19/03/2022 to 06/06/2022
Date of Report	:	06/06/2022
Test Report No.	:	MMA/06-22/16
Page	:	1 of 5

TEST REPORT

Sl. No.	Location →	Existing Plant area (Admin Building)			Bhanuparha Village			Gandijhara Village		
	Date of sampling↓	CO (mg/m^3)	BaP (ng/m^3)	C_6H_6 ($\mu g/m^3$)	CO (mg/m^3)	BaP (ng/m^3)	C_6H_6 ($\mu g/m^3$)	CO (mg/m^3)	BaP (ng/m^3)	C_6H_6 ($\mu g/m^3$)
1	1 - 02-03-2022	0.552	N. D	N. D	0.120	N. D	N. D	0.373	N. D	N. D
2	4 - 05-03-2022	0.795	N. D	N. D	0.284	N. D	N. D	0.495	N. D	N. D
3	9 - 10-03-2022	0.788	N. D	N. D	0.458	N. D	N. D	0.456	N. D	N. D
4	12 - 13-03-2022	0.712	N. D	N. D	0.154	N. D	N. D	0.388	N. D	N. D
5	16 - 17-03-2022	0.753	N. D	N. D	0.193	N. D	N. D	0.514	N. D	N. D
6	19 - 20-03-2022	0.608	N. D	N. D	0.430	N. D	N. D	0.573	N. D	N. D
7	24 - 25-03-2022	0.802	N. D	N. D	0.115	N. D	N. D	0.466	N. D	N. D
8	27 - 28-03-2022	0.635	N. D	N. D	0.430	N. D	N. D	0.548	N. D	N. D
9	1 - 02-04-2022	0.712	N. D	N. D	0.250	N. D	N. D	0.378	N. D	N. D
10	4 - 05-04-2022	0.656	N. D	N. D	0.408	N. D	N. D	0.407	N. D	N. D
11	9 - 10-04-2022	0.385	N. D	N. D	0.137	N. D	N. D	0.412	N. D	N. D
12	12 - 13-04-2022	0.566	N. D	N. D	0.408	N. D	N. D	0.514	N. D	N. D
13	16 - 17-04-2022	0.691	N. D	N. D	0.374	N. D	N. D	0.417	N. D	N. D
14	19 - 20-04-2022	0.510	N. D	N. D	0.413	N. D	N. D	0.397	N. D	N. D
15	24 - 25-04-2022	0.760	N. D	N. D	0.402	N. D	N. D	0.388	N. D	N. D
16	27 - 28-04-2022	0.621	N. D	N. D	0.413	N. D	N. D	0.568	N. D	N. D
17	1 - 02-05-2022	0.503	N. D	N. D	0.430	N. D	N. D	0.383	N. D	N. D
18	4 - 05-05-2022	0.684	N. D	N. D	0.148	N. D	N. D	0.378	N. D	N. D
19	9 - 10-05-2022	0.344	N. D	N. D	0.216	N. D	N. D	0.529	N. D	N. D
20	12 - 13-05-2022	0.746	N. D	N. D	0.227	N. D	N. D	0.485	N. D	N. D
21	17 - 18-05-2022	0.448	N. D	N. D	0.171	N. D	N. D	0.451	N. D	N. D
22	20 - 21-05-2022	0.455	N. D	N. D	0.205	N. D	N. D	0.505	N. D	N. D
23	25 - 26-05-2022	0.427	N. D	N. D	0.115	N. D	N. D	0.558	N. D	N. D
24	28 - 29-05-2022	0.538	N. D	N. D	0.385	N. D	N. D	0.344	N. D	N. D
	Minimum	**0.344**	-	-	**0.115**	-	-	**0.344**	-	-
	Maximum	**0.802**	-	-	**0.458**	-	-	**0.573**	-	-
	Average	**0.612**	-	-	**0.287**	-	-	**0.455**	-	-
	98 percentile	**0.799**	-	-	**0.445**	-	-	**0.571**	-	-

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ANNEXURE : III Contd..

Sl. No.	Location →	Chararhagarhia Village			Jharhabandh Village			Naraharipur Shasan Village		
	Date of sampling↓	CO (mg/m^3)	BaP (ng/m^3)	C_6H_6 ($\mu g/m^3$)	CO (mg/m^3)	BaP (ng/m^3)	C_6H_6 ($\mu g/m^3$)	CO (mg/m^3)	BaP (ng/m^3)	C_6H_6 ($\mu g/m^3$)
1	2 - 03-03-2022	0.687	N. D	N. D	0.235	N. D	N. D	0.140	N. D	N. D
2	5 - 06-03-2022	0.559	N. D	N. D	0.573	N. D	N. D	0.284	N. D	N. D
3	10 - 11-03-2022	0.655	N. D	N. D	0.294	N. D	N. D	0.157	N. D	N. D
4	13 - 14-03-2022	0.631	N. D	N. D	0.454	N. D	N. D	0.242	N. D	N. D
5	17 - 18-03-2022	0.422	N. D	N. D	0.448	N. D	N. D	0.344	N. D	N. D
6	20 - 21-03-2022	0.599	N. D	N. D	0.549	N. D	N. D	0.335	N. D	N. D
7	25 - 26-03-2022	0.446	N. D	N. D	0.330	N. D	N. D	0.140	N. D	N. D
8	28 - 29-03-2022	0.559	N. D	N. D	0.259	N. D	N. D	0.267	N. D	N. D
9	2 - 03-04-2022	0.671	N. D	N. D	0.371	N. D	N. D	0.293	N. D	N. D
10	5 - 06-04-2022	0.229	N. D	N. D	0.573	N. D	N. D	0.344	N. D	N. D
11	10 - 11-04-2022	0.655	N. D	N. D	0.537	N. D	N. D	0.115	N. D	N. D
12	13 - 14-04-2022	0.679	N. D	N. D	0.413	N. D	N. D	0.149	N. D	N. D
13	17 - 18-04-2022	0.261	N. D	N. D	0.549	N. D	N. D	0.140	N. D	N. D
14	20 - 21-04-2022	0.462	N. D	N. D	0.389	N. D	N. D	0.301	N. D	N. D
15	25 - 26-04-2022	0.422	N. D	N. D	0.383	N. D	N. D	0.250	N. D	N. D
16	28 - 29-04-2022	0.527	N. D	N. D	0.484	N. D	N. D	0.191	N. D	N. D
17	2 - 03-05-2022	0.285	N. D	N. D	0.312	N. D	N. D	0.250	N. D	N. D
18	5 - 06-05-2022	0.237	N. D	N. D	0.478	N. D	N. D	0.284	N. D	N. D
19	10 - 11-05-2022	0.237	N. D	N. D	0.229	N. D	N. D	0.242	N. D	N. D
20	13 - 14-05-2022	0.607	N. D	N. D	0.294	N. D	N. D	0.276	N. D	N. D
21	18 - 19-05-2022	0.599	N. D	N. D	0.259	N. D	N. D	0.182	N. D	N. D
22	21 - 22-05-2022	0.326	N. D	N. D	0.472	N. D	N. D	0.149	N. D	N. D
23	26 - 27-05-2022	0.687	N. D	N. D	0.442	N. D	N. D	0.250	N. D	N. D
24	29 - 30-05-2022	0.229	N. D	N. D	0.431	N. D	N. D	0.165	N. D	N. D
Minimum		**0.229**	**-**	**-**	**0.229**	**-**	**-**	**0.115**	**-**	**-**
Maximum		**0.687**	**-**	**-**	**0.573**	**-**	**-**	**0.344**	**-**	**-**
Average		**0.486**	**-**	**-**	**0.407**	**-**	**-**	**0.229**	**-**	**-**
98 percentile		**0.687**	**-**	**-**	**0.573**	**-**	**-**	**0.344**	**-**	**-**

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Test Report No. : MMA/06-22/16

ANNEXURE : III Contd..

Sl. No.	Location →	Meramundali Bazar			Motanga Village		
	Date of sampling↓	CO (mg/m^3)	BaP (ng/m^3)	C_6H_6 ($\mu g/m^3$)	CO (mg/m^3)	BaP (ng/m^3)	C_6H_6 ($\mu g/m^3$)
1	3 - 04-03-2022	0.584	N. D	N. D	0.543	N. D	N. D
2	6 - 07-03-2022	0.727	N. D	N. D	0.486	N. D	N. D
3	11 - 12-03-2022	0.749	N. D	N. D	0.330	N. D	N. D
4	14 - 15-03-2022	0.644	N. D	N. D	0.242	N. D	N. D
5	18 - 19-03-2022	0.539	N. D	N. D	0.493	N. D	N. D
6	21 - 22-03-2022	0.344	N. D	N. D	0.687	N. D	N. D
7	26 - 27-03-2022	0.584	N. D	N. D	0.599	N. D	N. D
8	29 - 30-03-2022	0.802	N. D	N. D	0.443	N. D	N. D
9	3 - 04-04-2022	0.501	N. D	N. D	0.286	N. D	N. D
10	6 - 07-04-2022	0.742	N. D	N. D	0.424	N. D	N. D
11	11 - 12-04-2022	0.689	N. D	N. D	0.637	N. D	N. D
12	14 - 15-04-2022	0.697	N. D	N. D	0.637	N. D	N. D
13	18 - 19-04-2022	0.802	N. D	N. D	0.229	N. D	N. D
14	21 - 22-04-2022	0.682	N. D	N. D	0.593	N. D	N. D
15	26 - 27-04-2022	0.381	N. D	N. D	0.405	N. D	N. D
16	29 - 30-04-2022	0.479	N. D	N. D	0.625	N. D	N. D
17	3 - 04-05-2022	0.494	N. D	N. D	0.568	N. D	N. D
18	6 - 07-05-2022	0.577	N. D	N. D	0.461	N. D	N. D
19	11 - 12-05-2022	0.396	N. D	N. D	0.254	N. D	N. D
20	14 - 15-05-2022	0.419	N. D	N. D	0.430	N. D	N. D
21	19 - 20-05-2022	0.396	N. D	N. D	0.468	N. D	N. D
22	22 - 23-05-2022	0.381	N. D	N. D	0.512	N. D	N. D
23	27 - 28-05-2022	0.607	N. D	N. D	0.574	N. D	N. D
24	30 - 31-05-2022	0.494	N. D	N. D	0.512	N. D	N. D
Minimum		**0.344**	-	-	**0.229**	-	-
Maximum		**0.802**	-	-	**0.687**	-	-
Average		**0.571**	-	-	**0.477**	-	-
98 percentile		**0.802**	-	-	**0.664**	-	-

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ANNEXURE : III Contd..

Location	Date of Sampling	Pb ($\mu g/m^3$)	As (ng/m^3)	Ni (ng/m^3)
Existing Plant area (Admin Building)	16-17/03/2022	BDL	BDL	BDL
	19-20/03/2022	BDL	BDL	BDL
	9-10/04/2022	BDL	BDL	BDL
	12-13/04/2022	BDL	BDL	BDL
	09-10/05/2022	BDL	BDL	BDL
	12-13/05/2022	BDL	BDL	BDL
Bhanuparha Village	16-17/03/2022	BDL	BDL	BDL
	19-20/03/2022	BDL	BDL	BDL
	9-10/04/2022	BDL	BDL	BDL
	12-13/04/2022	BDL	BDL	BDL
	09-10/05/2022	BDL	BDL	BDL
	12-13/05/2022	BDL	BDL	BDL
Gandijhara Village	16-17/03/2022	BDL	BDL	BDL
	19-20/03/2022	BDL	BDL	BDL
	9-10/04/2022	BDL	BDL	BDL
	12-13/04/2022	BDL	BDL	BDL
	09-10/05/2022	BDL	BDL	BDL
	12-13/05/2022	BDL	BDL	BDL
Chararhagarhia Village	10-11/03/2022	BDL	BDL	BDL
	13-14/03/2022	BDL	BDL	BDL
	05-06/04/2022	BDL	BDL	BDL
	10-11/04/2022	BDL	BDL	BDL
	18-19/05/2022	BDL	BDL	BDL
	21-22/05/2022	BDL	BDL	BDL
Jharhabandh Village	10-11/03/2022	BDL	BDL	BDL
	13-14/03/2022	BDL	BDL	BDL
	05-06/04/2022	BDL	BDL	BDL
	10-11/04/2022	BDL	BDL	BDL
	18-19/05/2022	BDL	BDL	BDL
	21-22/05/2022	BDL	BDL	BDL
Naraharipur Shasan Village	10-11/03/2022	BDL	BDL	BDL
	13-14/03/2022	BDL	BDL	BDL
	05-06/04/2022	BDL	BDL	BDL
	10-11/04/2022	BDL	BDL	BDL
	18-19/05/2022	BDL	BDL	BDL
	21-22/05/2022	BDL	BDL	BDL

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ANNEXURE : III Contd..

Location	Date of Sampling	Pb ($\mu g/m^3$)	As (ng/m^3)	Ni (ng/m^3)
Meramundali Bazar	18-19/03/2022	BDL	BDL	BDL
	21-22/03/2022	BDL	BDL	BDL
	21-22/04/2022	BDL	BDL	BDL
	26-27/04/2022	BDL	BDL	BDL
	22-23/05/2022	BDL	BDL	BDL
	27-28/05/2022	BDL	BDL	BDL
Motanga Village	18-19/03/2022	BDL	BDL	BDL
	21-22/03/2022	BDL	BDL	BDL
	21-22/04/2022	BDL	BDL	BDL
	26-27/04/2022	BDL	BDL	BDL
	22-23/05/2022	BDL	BDL	BDL
	27-28/05/2022	BDL	BDL	BDL

Parameter	CO (mg/m^3)	BaP (ng/m3)	Benzene ($\mu g/m3$)	Pb ($\mu g/m^3$)	As (ng/m^3)	Ni (ng/m^3)
Protocol of Measurement	Electro-chemical Detection	IS:5182 (Part 12)	IS:5182 (Part 11)	IS 3025 (Part 2): 2004, RA 2019		
National Ambient Air Quality Standards (2009) for Concentration in Ambient Air for Industrial, Residential, Rural & Other areas.	2 (8 Hourly)	1 (Annual)	5 (Annual)	1.0 (24 hours)	06 (Annual)	20 (Annual)

Note: BDL (Below Detection Limit) of Pb<0.07µg/m^3, As<0.4, Ni<0.6ng/m^3.
N.D: Not detected, FWIM: Field Work Instruction Manual

Prepared by
Rashmi Gupta
Administrative Manager

Checked by
Dr. Marisha Sharma
Authorised Signatory

- end of report -

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NATIONAL AMBIENT AIR QUALITY STANDARDS

CENTRAL POLLUTION CONTROL BOARD

NOTIFICATION

Delhi, the 18th November, 2009

No.B-29016/20/90/PCI-I. In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No.14 of 1981), and in supersession of the Notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), µg/m³	Annual*	50	20	- Improved West and Gaeke - Ultraviolet fluorescence
		24 hours**	80	80	
2	Nitrogen Dioxide (NO_2), µg/m³	Annual*	40	30	- Modified Jacob & Hochheiser (Na-Arsenite) - Chemiluminescence
		24 hours**	80	80	
3	Particulate Matter (size less than 10µm) or PM_{10} µg/m³	Annual*	60	60	- Gravimetric - TOEM - Beta attenuation
		24 hours**	100	100	
4	Particulate Matter (size less than 2.5µm) or $PM_{2.5}$ µg/m³	Annual*	40	40	
		24 hours**	60	60	
5	Ozone (O_3) µg/m³	8 hours**	100	100	- UV photometric - Chemiluminescence - Chemical Method
		1 hour**	180	180	
6	Lead (Pb) µg/m³	Annual*	0.50	0.50	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
		24 hours**	1.0	1.0	
7	Carbon Monoxide (CO) mg/m³	8 hours**	02	02	- Non Dispersive Infra Red (NDIR) spectroscopy
		1 hour**	04	04	
8	Ammonia (NH_3) µg/m³	Annual*	100	100	-Chemiluminescence -Indophenol blue method
		24 hours**	400	400	
9	Benzene (C_6H_6) µg/m³	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP) - particulate phase only, ng/m³	Annual*	01	01	Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m³	Annual*	06	06	- AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m³	Annual*	20	20	AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: — Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

SANT PRASAD GAUTAM, Chairman
[Advt.-III/4/184/09/Env.]

Note: The notifications on National Ambient Air Quality Standards were published by the Central Pollution Control Board in the Gazette of India, Extraordinary vide notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998.

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Recognised by MOEF&CC (Sl. No. 87 of S.O. 3744 (E) Dated 17/10/2018)

Test Report No. : MMW/05-22/60
ULR Number : TC633722000000070F

ANNEXURE : V

TEST REPORT

Customer's Name & Address
Rungta Mines Ltd. (Lead Alloys Division)
Vill - Tiasahi, P.O - Mahanadi
Dist. Dhenkanal, Odisha - 759121
Contact Person: Mr. G.P. Sharma, Phone: 06763-258881

Sample Particulars

Type of Sample : Ground water
Work Order No. : 4500058086
Sampling location : In and around expansion of Lead Alloy Plant, Odisha
Sampling Procedure : Section 9.0 of IVAM, dated: 15.12.2020
Sample Quantity : 1 lit
Sampling Team : MMRDL (Gaurav)
Sample Reg. No. : MMW/05-22/21.1.21.0
Date(s) of Sampling : 24.05.2022
Date(s) of Receipt : 26-05-2022
Date(s) of Testing : 26/05/2022 to 31/05/2022
Date of Report : 31-05-2022
Test Report No. : MMW/05-22/60
ULR Number : TC633722000000070F

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS			
	Acceptable	Permissible		Existing Plant near Admin Building (Bore Well)	Charanhapalia Village (Hand Pump)	Nuagan Village (Hand Pump)	Jharhapadi Village (Hand Pump)
Turbidity, NTU	1	5	IS 3025 (Part 10): 1984 RA 2017	BDL	0.517	0.451	0.775
pH value	6.5 - 8.5	No relaxation	IS 3025 (Part 11): 1983 RA 2017	7.8	7.2	7.0	6.7
Specific Conductance, µS/cm			IS 3025 (Part 14): 2013 RA 2018	1155	2287	1004	1053
Total Dissolved Solids, mg/l	500	2000	IS 3025 (Part 16): 1984 RA 2017	732	1402	1060	644
Total Suspended Solids, mg/l			IS 3025 (Part 17): 1984 RA 2017	4	BDL	BDL	2
Total Hardness as CaCO3, mg/l	200	600	IS 3025 (Part 21): 2009 RA 2014	466	859	516	398
Alkalinity, mg/l	200	600	APHA 23rd Ed. 2320 B: 2017	510	614	584	188
Sulphate as SO4, mg/l	200	400	IS 3025 (Part 24): 1986 RA 2019	64	187	127	58
Chloride as Cl, mg/l	250	1000	IS 3025 (Part 32): 1988 RA 2019	97	335	129	149
Calcium as Ca, mg/l	75	200	IS 3025 (Part 40): 1991 RA 2019	103	182	98	85
Sodium as Na, mg/l			IS 3025 (Part 45): 1993 RA 2019	60.5	110.2	150.5	92.2
Potassium as K, mg/l	-	-	IS 3025 (Part 45): 1993 RA 2019	5.2	9.8	9.6	6.7

NOTES :
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ANNEXURE : V Contd..

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS			
	Acceptable	Permissible		Existing Plant near Admin Building (Bore Well)	Gharaghaghia Village (Hand Pump)	Nuapan Village (Hand Pump)	Jharhasandi Village (Hand Pump)
Magnesium as Mg, mg/l	30	100	IS 3025 (Part 46): 1994 RA 2014	48	1.7	60	32
Fluoride as F, mg/l	1.0	1.5	APHA 23rd ed 4500-F- D 2017	1.12	1.01	0.91	0.47
Acidity mg/l CaCO3			IS 3025 (Part 22): 1988 RA 2019	5 at pH 8.3	22.5 at pH 8.3	10 at pH 8.3	32.5 at pH 8.3
Nitrate as NO3, mg/l	45	No relaxation	APHA 23rd ed 4500 NO3- B: 2017	2.29	46.52	27.46	27.09
Hexavalent Chromium, mg/l			APHA 23rd ed 3500 Cr B: 2017	BDL	BDL	BDL	BDL

NOTE : BDL(Below Detectable Limit) of Turbidity (NTU)-0.01, TDS-2, Color-0.7 cu°

EMMS Operations Instruction Manual

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ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address
Nunglo Mines Ltd. (Ferro Alloy Division)
Vill - Tukasinga, P.O - Meramandali
Dist. Dhenkanal, Odisha -759121
Contact Person: Mr. G.P. Sharma, Phone: 08582-252888

Sample Particulars

Type of Sample : Ground water
Work Order No. : 4800028085
Sampling location : In and around Expansion of Ferro Alloy Plant, Odisha
Sampling Procedure : Section 3.3, of IWW, dated 16.12.2020
Sample Qty. : 1 lit
Sampling Team : MWRDL (Chairman)
Sample Reg. No. : MMW/05-22/61-210
Date(s) of Sampling : 24.05.2022
Date(s) of Receipt : 28-05-2022
Date(s) of Testing : 28/05/2022 to 31/05/2022
Date of Report : 31-05-2022
Test Report No. : MMW/05-22/60
ULR Number : TC633722000000070F

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS			
	Acceptable	Permissible		Chitiparia Village (Hand Pump)	Meramundali Bazar (Hand Pump)	Shikapur Village (Hand Pump)	Gelaberna Village (Hand Pump)
Turbidity, NTU	1	5	IS 3025 (Part 10): 1984, RA 2017	0.086	0.603	2.415	0.349
pH value	6.5 - 8.5	No relaxation	IS 3025 (Part 11): 1983, RA 2017	7.0	7.7	7.2	6.9
Specific Conductance, µS/cm			IS 3025 (Part 14): 2013, RA 2018	1675	1952	1489	1012
Total Dissolved Solids, mg/l	500	2000	IS 3025 (Part 16): 1984, RA 2017	1150	1284	930	1002
Total Suspended Solids, mg/l			IS 3025 (Part 17): 1984, RA 2017	2	BDL	0	2
Total Hardness as CaCO3, mg/l	200	600	IS 3025 (Part 21): 2009, RA 2019	690	640	655	416
Alkalinity, mg/l	200	600	APHA 23rd ed. 2017 B: 2017	466	470	470	307
Sulphate as SO4, mg/l	200	400	IS 3025 (Part 24): 1986, RA 2019	117	120	115	118
Chloride as Cl, mg/l	250	1000	IS 3025 (Part 32): 1988, RA 2019	278	327	220	227
Calcium as Ca, mg/l	75	200	IS 3025 (Part 40): 1991, RA 2019	160	120	130	96
Sodium as Na, mg/l			IS 3025 (Part 45): 1993, RA 2019	45.5	146.0	51.5	166.0
Potassium as K, mg/l	-	-	IS 3025 (Part 45): 1993, RA 2019	5.8	5.8	2	4.6

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ANNEXURE : V Contd..

Test Report No. : MMW/05-22/60
ULR Number : TC633722000000070F

Parameters	Drinking water limits (IS: 10500:2012 Amendment 3, 2021)		Protocol	TEST RESULTS			
	Acceptable	Permissible		Chilipara Village (Hand Pump)	Naramu-nekli Bazar (Hand Pump)	Shivapur Village (Hand Pump)	Gokapara Village (Hand Pump)
Magnesium as Mg, mg/l	30	100	IS 3025 (Part 46): 1994, RA 2019	67	62	76	41
Fluoride as F, mg/l	1.0	1.5	APHA 23rd Ed. 4500 F- C: 2017	0.55	0.58	0.57	0.60
Alkalinity as CaCO3			IS 3025 (Part 23): 1986, RA 2019	20 at pH 8.3	17.5 at pH 8.3	20 at pH 8.3	27.5 at pH 8.3
Nitrate as NO3, mg/l	45	No relaxation	APHA 23rd Ed. 4500 NO3- B: 2017	42.44	10.79	27.35	4.17
Hexavalent Chromium, mg/l			APHA 23rd Ed. 3500 Cr B: 2017	BDL	BDL	BDL	BDL

Note : BDL-Below Detection Limit, RA-Reaffirmed, Table-3, Sr.No.-1 appl

CMW: Chief Work Instruction Manual

Prepared By
Rashmi Gupta
Administrative Manager

Checked By
Dr. Marisha Sharma
Authorised Signatory

:: End of Report ::

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Test Report No. : MMW/05-22/61
ULR Number :-

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address Rungta Mines Ltd. (Tarbo Mines Division) Vill - Tukadihi, P.O - Mesmeruddi Dist. Dhenkanal, Odisha PIN-21 Contact Person: Mr. G.P. Sharma, Phone: 09782-298881							
Sample Particulars							
Type of Sample : Ground water Work Order No. : 4800028096							
Sampling location : In and around expansion of Tarbo Mines Plant, Odisha							
Sampling Procedure : Section 3.0, of IWM, dated No. 12.2020							
Sample Vol./Qty. : 1 l							
Sampling Team : MMRDL (Gaurav)							
Sample Reg. No. : MW/W/05-22/21.1.21.0							
Date(s) of Sampling : 24.05.2022							
Date(s) of Receipt : 25-05-2022							
Date(s) of Testing : 26/05/2022 to 31/05/2022							
Date of Report : 31-05-2022							
Test Report No. : MMW/05-22/61							
Parameters	**Drinking water limits (IS: 10500:2012, Amendment 3, 2021)**		**Protocol**	**TEST RESULTS**			
	Acceptable	**Permissible**		**Existing Plant near Admin Building (Bore Well)**	**Chanchaya-ahla Village (Hand Pump)**	**Nuagan Village (Hand Pump)**	**Jharbeli-ondh Village (Hand Pump)**
Iron as Fe, mg/l	1.0	No relaxation	IS 3025 (Part 53): 2003, RA 2019	BDL	BDL	BDL	BDL
Silver as Ag, mg/l	0.1	No relaxation	IS 3025 (Part 7): 2004, RA 2019	BDL	BDL	BDL	BDL
Barium as Ba, mg/l	0.7	No relaxation	IS 3025 (Part 2): 2004, RA 2019	0.248	0.101	0.080	0.090
Boron as B, mg/l	0.5	2.4	IS 3025 (Part 2): 2004, RA 2019	0.042	0.046	0.026	0.019
Beryllium as Be, mg/l			IS 3025 (Part 5): 2004, RA 2019	BDL	BDL	BDL	BDL
Cadmium as Cd, mg/l	0.003	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Chromium as Cr, mg/l	0.05	No relaxation	IS 3025 (Part 7): 2004, RA 2019	BDL	BDL	BDL	BDL
Cobalt as Co, mg/l			IS 3025 (Part 5): 2004, RA 2019	BDL	BDL	BDL	BDL
Copper as Cu, mg/l	0.05	1.5	IS 3025 (Part 2): 2004, RA 2019	0.015	BDL	BDL	BDL
Lead as Pb, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Manganese as Mn, mg/l	0.1	0.3	IS 3025 (Part 7): 2004, RA 2019	BDL	BDL	BDL	0.135
Nickel as Ni, mg/l	0.02	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Selenium as Se, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Arsenic as As, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Zinc as Zn, mg/l	5	15	IS 3025 (Part 2): 2004, RA 2019	0.028	0.030	0.025	BDL

NOTE : BDL(Below Detection Limit) of As=0.01, Be=0.02, Cd=0.003, Co=0.01, Cr=0.01, Cu=0.01, Fe=0.03, Mn=0.02, Ni=0.02, Se=0.01, Ag=0.01, Zn=0.02 mg/l

HMW: Hand Wash Protection Manual

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ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address
Rungta Mines Ltd. (Ferro Alloys Division)
Vill - Tilakatilla, P.O - Meramandali
Dist. : Dhenkanal, Odisha - 759121
Contact Person : Mr. O.P. Sharma, Phone: 06762-268881

Sample Particulars

Type of Sample : Ground water
Work Order No : 4800028695
Sampling location : In and around expansion of Ferro Alloy Plant, Odisha
Sampling Procedure : Section 3.0, of FWIM, dated : 5.12.2020
Sample Quantity : 1 lt
Sampling Team : MMRDL (Gaurav)
Sample Reg. No. : MMW/05-22/21, 1.21.6
Date(s) of Sampling : 24.05.2022
Date(s) of Receipt : 26-05-2022
Date(s) of Testing : 26/05-2022 to 31-05-2022
Date of Report : 31-05-2022
Test Report No. : MMW/05-22/61

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	ILSI KLSULIS			
	Acceptable	Permissible		Chilipada Village (Hand Pump)	Meramandali Bazar (Hand Pump)	Shilapur Village (Hand Pump)	Salapada Village (Hand Pump)
Iron as Fe, mg/l	1.0	No relaxation	IS 3025 (Part 53): 2003, RA 2019	BDL	BDL	0.37	BDL
Silver as Ag, mg/l	0.1	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Barium as Ba, mg/l	0.7	No relaxation	IS 3025 (Part 2): 2004, RA 2019	0.147	0.087	0.048	0.125
Boron as B, mg/l	0.5	2.4	IS 3025 (Part 2): 2004, RA 2019	0.300	0.373	0.046	0.357
Uranium as U, mg/l			IS 3025 (Part 51): 2018	BDL	BDL	BDL	BDL
Cadmium as Cd, mg/l	0.003	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Chromium as Cr, mg/l	0.05	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Cobalt as Co, mg/l			IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Copper as Cu, mg/l	0.05	1.5	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Lead as Pb, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Manganese as Mn, mg/l	0.1	0.3	IS 3025 (Part 2): 2004, RA 2019	0.268	BDL	0.012	0.272
Nickel as Ni, mg/l	0.02	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Selenium as Se, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Arsenic as As, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2004, RA 2019	BDL	BDL	BDL	BDL
Zinc as Zn, mg/l	5	15	IS 3025 (Part 2): 2004, RA 2019	0.648	0.221	0.109	0.064

NOTE : BDL(Below Detection Limit) of Fe=0.1, Ag=0.01, B=0.02, Co=0.002, Cr=0.01, Cu=0.01, Cu=0.01, Pb=0.01, Mn=0.01, Ni=0.01, Se=0.01, As=0.01, Zn=0.01 mg/l

FWIM: Field work instruction Manual

Prepared By
Rashmi Gupta
Administrative Manager

Checked By
Dr. Marisha Sharma
Authorised Signatory

:: End of Report ::

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Test Report No. : MMW/05-22/62
ULR Number : TC633722000000071F

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address
Nungla Mines Ltd. (Hemo Alloy Division)
Vill - Tubanidih, P.O - Veeramunda
Dist. - Dhenkanal, Odisha - 759121
Contact Person : Mr. G.P. Sharma, Phone : 08582-278887

Sample Particulars

Type of Sample : Surface water
Work Order No. : 4800028085
Sampling location : In and around Expansion of Hemo Alloy Plant, Odisha
Sampling Procedure : Section 3.3, of IWW, dated 16.12.2020
Sample Quantity : 2 lit
Sampling Team : MMRDL (Courier)
Sample Reg. No. : MMW/05-22/62 & 63
Date(s) of Sampling : 25.05.2022
Date(s) of Receipt : 28-05-2022
Date(s) of Testing : 26-05-2022 to 31-Oct-2022
Date of Report : 31-05-2022
Test Report No. : MMW/05-22/62
ULR Number : TC633722000000071F

Parameters	Drinking water limits (IS: 10500:2012, Amendment: 3, 2021)		Protocol	TEST RESULTS			
	Acceptable	Permissible		Reservoir in Existing Plant area	Pond in Chanda-garhia Village	Lingra Nallah near Gandhi-ma Village (Up Stream)	Lingra Nallah near Matanga Village (Down Stream)
Turbidity, NTU	1	5	IS 3025 (Part 10) 1984 RA 2017	1.035	4.441	1.39	0.778
pH value	6.5 - 8.5	No relaxation	IS 3025 (Part 11) 1983 RA 2017	8.5	7.7	7.8	8.1
Specific Conductance, µS/cm			IS 3025 (Part 14) 2013 RA 2018	721	118	575	702
Total Dissolved Solids, mg/l	500	2000	IS 3025 (Part 16) 1984 RA 2017	110	201	501	104
Total Suspended Solids, mg/l	-	-	IS 3025 (Part 17) 1984 RA 2017	4	4	8	BDL
Total Hardness as CaCO3, mg/l	200	600	IS 3025 (Part 21) 2009 RA 2019	208	104	232	188
Alkalinity, mg/l	200	600	APHA 23rd Ed 2320 B 2017	178	149	178	178
Sulphate as SO4, mg/l	200	400	IS 3025 (Part 24) 1986 RA 2019	54	19	72	52
Phosphamate as P, mg/l	-	-	IS 3025 (Part 31) 1988 RA 2019	0.004	0.000	BDL	BDL
Chloride as Cl, mg/l	250	1000	IS 3025 (Part 32) 1988 RA 2019	96	41	159	119
Calcium as Ca, mg/l	75	200	IS 3025 (Part 40) 1991 RA 2019	45	22	58	36
Dissolved Oxygen, mg/l	-	-	IS 3025 (Part 38) 1989 RA 2019	7.1	5.4	7.1	6.8

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ANNEXURE : V Contd..

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS			
	Acceptable	Permissible		Reservoir in Existing Plant area	Pond in Chandigarhia Village	Lingra Nallah near Gandhara Village (Up Stream)	Lingra Nallah near Mataiga Village (Down Stream)
Biochemical Oxygen Demand (3 Days at 27°C), mg/l			IS 3025 (Part 44) : 1993 Reaffirmed 2019	7.6	10.8	4.8	4.6
Chemical Oxygen Demand (COD), mg/l			APHA 23rd Ed. 5220 B, 2017	21	40	8	8
Sodium as Na, mg/l	-	-	IS 3025 (Part 45) : 1993 Reaffirmed 2019	61.2	49.6	102.5	84.0
Potassium as K, mg/l			IS 3025 (Part 45) : 1993 Reaffirmed 2019	13.6	5.2	3.0	14.1
Magnesium as Mg, mg/l	30	100	IS 3025 (Part 46) : 1994 Reaffirmed 2019	23	12	27	24
Fluoride as F, mg/l	1.0	1.5	APHA 23rd Ed. 4500-F- B, 2017	0.66	1.14	1.33	1.15
Oil & Grease, mg/l			IS 3025 (Part 39) 2021	BDL	BDL	BDL	BDL
Acidity, mg/l CaCO3	-	-	IS 3025 (Part 22) 1988 Reaffirmed 2019	Nil	Nil	Nil	Nil
Nitrate as NO3, mg/l	45	No relaxation	APHA 23rd Ed. 4500-NO3- B, 2017	5.71	2.64	7.83	5.65
Hexavalent Chromium, mg/l	-	-	APHA 23rd Ed. 3500-Cr B, 2017	Nil	Nil	Nil	Nil

NOTE : BDL-Below Detection Limit of TSS=2, P=0.003, COD=5, O&G=2, Acidity=5, NO3=0.5, Cr=0.1 mg/l

PWW: Pond Water, NS: Natural Stream

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ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address
Angla Mines Jt. Ferro Alloys Division
Vill - Tulasi Ilia, P.O - Meramandali
Dist. Dhenkanal, Odisha -759121
Contact Person: Mr. C.P. Sharma, Phone: 06762-259881

Sample Particulars

Type of Sample : Surface water
Work Order No : 4800029686
Sampling location : In and around Expansion of Ferro Alloy Plant, Odisha
Sampling Procedure : Section 3.0, of IWM, dated 15.12.2020
Sample Qty : 2 lit
Sampling Team : MMRDL (Caunay)
Sample Reg. No. : MMW/05-22/62 to 68
Date(s) of Sampling : 25.05.2022
Date of Receipt : 26-05-2022
Date(s) of Testing : 26/05/2022 to 31/05/2022
Date of Report : 31-05-2022
Test Report No. : MMW/05-22/62
ULR Number : TC633722000000071F

Parameters	Drinking water limits [IS: 10500:2012, Amendment 3, 2021]		Protocol	TEST RESULTS				
	Acceptable	Permissible		Pond near northern side of expansion area	Pond in Nimaishahi Village	Brahmani River near Kushapanga Village (Up Stream)	Brahmani River near Rinki Village (Down Stream)	Kengali Right Main Canal southern side of Expansion area
Turbidity, NTU	1	5	IS:3025 (Part 10): 1984, RA 2017	4.859	0.09	0.479	0.517	0.448
pH Value	6.5 - 8.5	No relaxation	IS:3025 (Part 11): 1983, RA 2017	8.0	7.8	8.0	8.1	8.2
Specific Conductance, µS/cm			IS:3025 (Part 14): 2013, RA 2018	702	911	187.0	216	181
Total Dissolved Solids, mg/l	500	2000	IS:3025 (Part 16): 1984, RA 2017	191	510	124	120	280
Total Suspended Solids, mg/l	-	-	IS:3025 (Part 17): 1984, RA 2017	5	4	2	4	6
Total Hardness as CaCO3, mg/l	200	600	IS:3025 (Part 21): 2009, RA 2014	258	192	80	80	204
Alkalinity, mg/l	200	600	IS:3025 (Part 23): 1986, RA 2017	238	252	88	84	80
Sulphate as SO4 mg/l	200	400	IS:3025 (Part 24): 1986, RA 2019	93	11	7	11	91
Phosphorous as P, mg/l	-	-	IS:3025 (Part 31): 1988, RA 2019	BD	0.011	BDL	BDL	BDL
Chlorides as Cl, mg/l	250	1000	IS:3025 (Part 32): 1988, RA 2019	55	121	18	18	35
Calcium as Ca, mg/l	75	200	IS:3025 (Part 40): 1991, RA 2019	51	42	16	18	48
Dissolved Oxygen, mg/l	-	-	IS:3025 (Part 38): 1989, RA 2019	6.7	6.6	6.8	6.8	7

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ANNEXURE : V Contd..

Test Report No. : MMW/05-22/62
ULR Number : TC633722000000071F

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS				
	Acceptable	Permissible		Pond near southern side of expansion area	Pond in Kinaishahi Village	Brahmani River near Kushapangi Village (Up Stream)	Brahmani River near Birhe Village (Down Stream)	Rengali Right Main Canal southern side of Lapanga area
Biochemical Oxygen Demand (BOD), mg/l			IS:3025 (Part-44):1993, RA 2019	13.5	18	4.5	4.5	9
Chemical Oxygen Demand (COD), mg/l			APHA 23rd Ed. 5220 D: 2017	35	43	BDL	BDL	21
Sodium as Na, mg/l	-	-	IS:3025 (Part 45):1993, RA 2019	35.0	86.3	7.2	11.1	13.6
Potassium as K, mg/l			IS:3025 (Part 45):1993, RA 2019	3.1	30	2.1	2.6	1.7
Magnesium as Mg, mg/l	30	100	IS:3025 (Part 46):1994, RA 2019	24	21	10	9	20
Fluoride as F, mg/l	1.0	1.5	APHA 23rd Ed. 4500-F- D: 2017	0.65	0.65	0.62	0.42	0.60
Oil & Grease, mg/l			IS:3025 (Part 39):1991	BDL	BDL	BDL	BDL	BDL
Acidity mg/l CaCO3	-	-	IS:3025 (Part 22):1986, RA 2019	BD	10 at pH 8.3	7.5 at pH 8.3	6 at pH 8.3	BDL
Nitrate as NO3, mg/l	45	No relaxation	APHA 23rd Ed. 4500-NO3- B: 2017	3.06	1.70	BDL	BDL	0.65
Hexavalent Chromium, mg/l	-	-	APHA 23rd Ed. 3500-Cr B: 2017	BDL	BDL	BDL	BDL	BDL

NOTE : BDL(Below Detection Limit) of TSS=2, F=0.600, COD=8, BOD=3, Acidity=5, NO3=0.5, Cr6+=0.4 mg/l

AWW: Hand Work Instruction Manual

Prepared By
Rashmi Gupta
Administrative Manager

Checked By
Dr. Marisha Sharma
Authorised Signatory

:: End of Report ::

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ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address
Nungla Mines Ltd. (Hemo Alloy Division)
Vill - Tubasidia, P.O - Vesamundali
Dist. - Dhenkanal, Odisha - 759121
Contact Person : Mr. G.P. Sharma, Phone : 06763-257888

Sample Particulars

Type of Sample : Surface water
Work Order No. : 4800028085
Sampling location : In and around Expansion of Hemo Alloy Plant, Odisha
Sampling Procedure : Section 3.3, of IWW, dated 16.12.2020
Sample Quantity : 2 lit
Sampling Team : MWRDL (Courier)
Sample Reg. No. : MMW/05-22/63 & 63.1 & 63.2
Date(s) of Sampling : 25.05.2022
Date(s) of Receipt : 26-05-2022
Date(s) of Testing : 26/05/2022 to 30/06/2022
Date of Report : 31-05-2022
Test Report No. : MMW/05-22/63

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	ITSI RESULTS			
	Acceptable	Permissible		Reservoir in Existing Plant area	Pond in Charana-ganda Village	Lingra Nadi near Gandhi-ara Village (Up Stream)	Lingra Nadi near Mosanga Village (Down Stream)
Arsenic as As, mg/l	0.01	No relaxation	IS 3025 (Part 37):2022 RA 2017	BDL	0.014	BDL	BDL
Silver as Ag, mg/l	0.1	No relaxation	IS 3025 (Part 2):2019, RA 2019	BDL	BDL	BDL	BDL
Barium as Ba, mg/l	0.7	No relaxation	IS 3025 (Part 62):2004, RA 2019	0.054	0.150	0.055	0.052
Boron as B, mg/l	0.5	2.4	IS 3025 (Part 57):2006, RA 2019	0.011	0.047	0.038	0.037
Chromium as Cr, mg/l			IS 3025 (Part 52):2003, RA 2019	BDL	BDL	BDL	BDL
Cadmium as Cd, mg/l	0.003	No relaxation	IS 3025 (Part 41):1992, RA 2019	BDL	BDL	BDL	BDL
Chromium as Cr, mg/l	0.05	No relaxation	IS 3025 (Part 52):2003, RA 2019	0.032	BD	BDL	BDL
Cobalt as Co, mg/l			IS 3025 (Part 39):2003, RA 2019	BDL	BDL	BDL	BDL
Copper as Cu, mg/l	0.05	1.5	IS 3025 (Part 42):1992, RA 2019	BDL	BDL	BDL	BDL
Lead as Pb, mg/l	0.01	No relaxation	IS 3025 (Part 47):2003, RA 2019	BDL	BD	BDL	BDL
Manganese as Mn, mg/l	0.1	0.3	IS 3025 (Part 59):2006, RA 2019	BDL	0.052	BDL	BDL
Nickel as Ni, mg/l	0.02	No relaxation	IS 3025 (Part 54):2003, RA 2019	BDL	BD	BDL	BDL

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ANNEXURE : V Contd..

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS			
	Acceptable	Permissible		Reservoir in Existing Plant area	Pond in Chiranjeevi Village	Lingra Kodi near Gandhi-ram Village (Up Stream)	Lingra Kodi near Motanga Village (Down Stream)
Selenium as Se, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2009, RA 2019	BDL	BDL	BDL	BDL
Arsenic as As, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2009, RA 2019	BDL	BDL	BDL	BDL
Zinc as Zn, mg/l	5	15	IS 3025 (Part 2): 2009, RA 2019	BDL	BDL	BDL	BDL
Total Coliform (MPN/100ml			IS 15185: 2016 RA 2021	<1.8	0.0	<1.8	<1.8
E. Coli	-	-	IS 15185:2016 RA 2021	Absent	Absent	Absent	Absent

BDL= Below Detectable Limit (<0.01), Cd=0.01, Ni=0.02, Cr=0.05, Cu=0.05, Fe=0.01, Mn=0.01, Pb=0.01, Hg=0.001, Se=0.01, As=0.01, Zn=0.01 mg/l

FWW: Field Work Undertaken Above

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ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address
Rungta Mines Ltd. (Lemo Mines Division)
Vill - Tukasilla, P.O - Mesmendali
Dist. Dhenkanal, Odisha 759121
Contact Person: Mr. G.P. Sharma, Phone: 09763-256881

Sample Particulars

Type of Sample : Surface water
Work Order No. : 4800058096
Sampling location : Inland around expansion of Lemo Mine Plant, Odisha
Sampling Procedure : Section 3.0, of IWM, dated No. 12.2020
Sample Vol./Qty. : 2 l
Sampling Team : MMRDL (Gaurav)
Sample Reg. No. : MW/W/05-22/25.1.2022
Date(s) of Sampling : 25.01.2022
Date(s) of Receipt : 26-01-2022
Date(s) of Testing : 26/01/2022 to 30/01/2022
Date of Report : 31-01-2022
Test Report No. : MMW/05-22/63

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS				
	Acceptable	Permissible		Pond near northern side of expansion area	Pond in Nimbahali Village	Brahmani River near Kushapangs Village (Up Stream)	Brahmani River near Birha Village (Down Stream)	Rangoli Right Main Canal southern side of Expansion area
Iron as Fe, mg/l	1.0	No relaxation	IS 3025 (Part 53): 2003, RA 2019	BDL	BDL	BDL	BDL	BDL
Silver as Ag, mg/l	0.1	No relaxation	IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL
Barium as Ba, mg/l	0.7	No relaxation	IS 3025 (Part 2): 2021, RA 2019	0.057	0.113	0.010	0.015	0.045
Boron as B, mg/l	0.5	2.4	IS 3025 (Part 2): 2021, RA 2019	0.084	0.043	0.004	0.023	0.010
Uranium as U, mg/l			IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL
Cadmium as Cd, mg/l	0.003	No relaxation	IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL
Chromium as Cr, mg/l	0.05	No relaxation	IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL
Cobalt as Co, mg/l			IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL
Copper as Cu, mg/l	0.05	1.5	IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL
Lead as Pb, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL
Manganese as Mn, mg/l	0.1	0.3	IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL
Nickel as Ni, mg/l	0.02	No relaxation	IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL

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ANNEXURE : V Contd..

Test Report No. : MMW/05-22/63
ULR Number :-

Parameters	Drinking water limits (IS: 10500:2012, Amendment 1: 2021)		Protocol	TEST RESULTS				
	Acceptable	Permissible		Pond near northern side of expansion area	Pond in Mandi-anali Village	Yamuna River near Kushalpur Village (Up Stream)	Yamuna River near Usha Village (Down Stream)	Rangali Right Main Canal southern side of Expansion area
Cadmium as Cd, mg/l	0.01	No relaxation	IS 3025 (Part 2): 2021, RA 2019	BDL	BDL	BDL	BDL	BDL
Arsenic as As, mg/l	0.01	No relaxation	IS 3025 (Part 3): 2004, RA 2019	BDL	BDL	BDL	BDL	BDL
Zinc as Zn, mg/l	5	15	IS 3025 (Part 3): 2004, RA 2019	BDL	BDL	BDL	0.025	BDL
Total Coliform (MPN/ 100ml)			IS 15185: 2016 Part 3 RA 2017	<1.8	<1.8	<1.8	<1.8	<1.8
E. Coli	-	-	IS 15185:2016 Part 3 RA 2017	Absent	Absent	Absent	Absent	Absent

Note : BDL (Below Detection Limit) for Cd=0.01, As=0.01, Ni=0.02, Cr=0.05, Cu=0.05, Fe=0.01, Cl=0.01, Pb=0.01, Zn=0.01, Mn=0.01, Se=0.01, Ag=0.01, Zn=0.01 mg/l

BMW: Bio Medical Waste Rules

Prepared By
Rashmi Gupta
Administrative Manager

Checked By
Dr. Marisha Sharma
Authorised Signatory

:: End of Report ::

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Min Mec R&D Laboratory
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Test Report No. : MMW/04-23/15 .

ULR Number : TC633723000000100F .

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address Rungta Mines Pvt. Ltd. (Ferro Alloys Division) Vill. - Tulasidiha, P.O. - Meramandali Dist. - Dhenkanal, Odisha - 759121 Contact Person: Mr. G. P. Sharma, Phone: 06582-256861							
Sample Particulars							
Type of Sample : Ground water							
Work Order No. : 4800028086							
Sampling location : in and around Expansion of Ferro Alloy Plant, Odisha							
Sampling Procedure : Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.12.2020							
Sample Vol./Qty. : 1 lit.							
Sampling Team : MMRDL (Gaurav)							
Sample Reg. No. : MMW/04-23/7.1-7.8							
Date(s) of Sampling : 23-04-2023							
Date(s) of Receipt : 25-04-2023							
Date(s) of Testing : 25/04/2023 to 26/04/2023							
Date of Report : 27-04-2023							
Test Report No. : MMW/04-23/15							
ULR Number : TC633723000000100F							
Parameters	**Drinking water limits (IS: 10500:2012, Amendment 3, 2021)**		**Protocol**	**TEST RESULTS**			
	Acceptable	**Permissible**	.	**Existing Plant near Admin Building (Bore Well)**	**Chararh-agarhia Village (Hand Pump)**	**Nuagan Village (Hand Pump)**	**Jharhab-andh Village (Hand Pump)**
Temperature, ℃	-	-	IS 3025 (Part 9): 1984, RA 2017	25	26	25	25
Phosphorous as P, mg/l	-	-	IS 3025 (Part 31): 1988, RA 2019	BDL	BDL	BDL	BDL
Ammonical Nitrogen as NH3, mg/l	-	-	APHA 23rd Ed. 4500-NH3 C: 2017	N.D	N.D	N.D	N.D

NOTE : BDL(Below Detection Limit) of P<0.003 mg/l

Abbreviation: FWIM- Field Work Instruction Manual, N.D- Not Detected

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Min Mec R&D Laboratory
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Test Report No. : MMW/04-23/15 .
ULR Number : TC633723000000100F .

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address
Rungta Mines Pvt. Ltd. (Ferro Alloys Division)
Vill. - Tulasidiha, P.O. - Meramandali
Dist. - Dhenkanal, Odisha - 759121
Contact Person: Mr. G. P. Sharma, Phone: 06582-256861

Sample Particulars

Type of Sample : Ground water
Work Order No. : 4800028086
Sampling location : in and around Expansion of Ferro Alloy Plant, Odisha
Sampling Procedure : Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.
Sample Vol./Qty. : 1 lit.
Sampling Team : MMRDL (Gaurav)
Sample Reg. No. : MMW/04-23/7.1-7.8
Date(s) of Sampling : 23-04-2023
Date(s) of Receipt : 25-04-2023
Date(s) of Testing : 25/04/2023 to 26/04/2023
Date of Report : 27-04-2023
Test Report No. : MMW/04-23/15
ULR Number : TC633723000000100F

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS			
	Acceptable	Permissible	.	Chitiparha Village (Hand Pump)	Meramu-ndali Bazar (Hand Pump)	Shibapur Village (Hand Pump)	Galaparha Village (Hand Pump)
Temperature, ℃	-	-	IS 3025 (Part 9): 1984, RA 2017	26	25	26	25
Phosphorous as P, mg/l	-	-	IS 3025 (Part 31): 1988, RA 2019	BDL	BDL	BDL	BDL
Ammonical Nitrogen as NH3, mg/l	-	-	APHA 23rd Ed. 4500-NH3 C: 2017	N.D	N.D	N.D	N.D

NOTE : BDL(Below Detection Limit) of P<0.003 mg/l

Abbreviation: FWIM- Field Work Instruction Manual, N.D- Not Detected

Prepared By
Rashmi Gupta
Administrative Manager

Checked By
Dr. Marisha Sharma
Authorised Signatory

:: End of Report ::

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Test Report No. : MMW/04-23/16 .
ULR Number : - .

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address Rungta Mines Pvt. Ltd. (Ferro Alloys Division) Vill. - Tulasidiha, P.O. - Meramandali Dist. - Dhenkanal, Odisha - 759121 Contact Person: Mr. G. P. Sharma, Phone: 06582-256861							
Sample Particulars							
Type of Sample : Ground water							
Work Order No. : 4800028086							
Sampling location : In and around Expansion of Ferro Alloy Plant, Odisha							
Sampling Procedure : Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.12.2020							
Sample Vol./Qty. : 1 lit.							
Sampling Team : MMRDL (Gaurav)							
Sample Reg. No. : MMW/04-23/7.1-7.8							
Date(s) of Sampling : 23-04-2023							
Date(s) of Receipt : 25-04-2023							
Date(s) of Testing : 25/04/2023 to 26/04/2023							
Date of Report : 27-04-2023							
Test Report No. : MMW/04-23/16							
Parameters	**Drinking water limits (IS: 10500:2012, Amendment 3, 2021)**		**Protocol**	**TEST RESULTS**			
	Acceptable	**Permissible**	.	**Existing Plant near Admin Building (Bore Well)**	**Chararh-agarhia Village (Hand Pump)**	**Nuagan Village (Hand Pump)**	**Jharhab-andh Village (Hand Pump)**
Phenol, mg/l	0.001	0.002	APHA 23rd Ed. 5530 D: 2017	N.D	N.D	N.D	N.D

Abbreviation: FWIM- Field Work Instruction Manual, N.D- Not Detected

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Test Report No. : MMW/04-23/16 .
ULR Number : - .

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address Rungta Mines Pvt. Ltd. (Ferro Alloys Division) Vill. - Tulasidiha, P.O. - Meramandali Dist. - Dhenkanal, Odisha - 759121 Contact Person: Mr. G. P. Sharma, Phone: 06582-256861							
Sample Particulars							
Type of Sample : Ground water							
Work Order No. : 4800028086							
Sampling location : In and around Expansion of Ferro Alloy Plant, Odisha							
Sampling Procedure : Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.							
Sample Vol./Qty. : 1 lit.							
Sampling Team : MMRDL (Gaurav)							
Sample Reg. No. : MMW/04-23/7.1-7.8							
Date(s) of Sampling : 23-04-2023							
Date(s) of Receipt : 25-04-2023							
Date(s) of Testing : 25/04/2023 to 26/04/2023							
Date of Report : 27-04-2023							
Test Report No. : MMW/04-23/16							
Parameters	**Drinking water limits (IS: 10500:2012, Amendment 3, 2021)**		**Protocol**	**TEST RESULTS**			
	Acceptable	**Permissible**	.	**Chitiparha Village (Hand Pump)**	**Meramu-ndali Bazar (Hand Pump)**	**Shibapur Village (Hand Pump)**	**Galaparha Village (Hand Pump)**
Phenol, mg/l	0.001	0.002	APHA 23rd Ed. 5530 D: 2017	N.D	N.D	N.D	N.D

Abbreviation: FWIM- Field Work Instruction Manual, N.D- Not Detected

Prepared By
Rashmi
Rashmi Gupta
Administrative Manager

Checked By
Marisha
Dr. Marisha Sharma
Authorised Signatory

:: End of Report ::

NOTES :
* Total liability of the laboratory is limited to the invoice amount
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* Complaint register is available with the laboratory, in case required

Min Mec R&D Laboratory
(A DIVISION OF MIN MEC CONSULTANCY PVT. LTD.)

Test Report No. : MMW/04-23/17 .

ULR Number : TC633723000000101F .

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address

Rungta Mines Pvt. Ltd. (Ferro Alloys Division)
Vill. - Tulasidiha, P.O. - Meramandali
Dist. - Dhenkanal, Odisha - 759121
Contact Person: Mr. G.P. Sharma, Phone: 06582-256861

Sample Particulars

Type of Sample : Surface water
Work Order No. : 4800028086
Sampling location : In and around Expansion of Ferro Alloy Plant, Odisha
Sampling Procedure : Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.12.2020
Sample Vol./Qty. : 2 lit.
Sampling Team : MMRDL (Gaurav)
Sample Reg. No. : MMW/04-23/8.1-8.9
Date(s) of Sampling : 24-04-2023
Date(s) of Receipt : 25-04-2023
Date(s) of Testing : 25/04/2023 to 27/04/2023
Date of Report : 27-04-2023
Test Report No. : MMW/04-23/17
ULR Number : TC633723000000101F

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS			
	Acceptable	Permissible	.	Reservoir in Existing plant area	Pond in Chararha-gadia	Lingra nadi near Gandijh-ara Village (Up Stream)	Lingra Nadi near Motanga Village (Down Stream)
Temperature, ℃	-	-	IS 3025 (Part 9): 1984, RA 2017	28	29	27	28
Ammonical Nitrogen as NH_3, mg/l	-	-	APHA 23rd Ed. 4500-NH_3 C: 2017	1.12	1.12	3.36	2.24

NOTE : BDL(Below Detection Limit) of NH3<0.56 mg/l

Abbreviation: FWIM- Field Work Instruction Manual

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Min Mec R&D Laboratory
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Test Report No. : MMW/04-23/17 .

ULR Number : TC633723000000101F .

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address

Rungta Mines Pvt. Ltd. (Ferro Alloys Division)
Vill. - Tulasidiha, P.O. - Meramandali
Dist. - Dhenkanal, Odisha - 759121
Contact Person: Mr. G.P. Sharma, Phone: 06582-256861

Sample Particulars

Type of Sample : Surface water
Work Order No. : 4800028086
Sampling location : In and around Expansion of Ferro Alloy Plant, Odisha
Sampling Procedure : Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.12.2020
Sample Vol./Qty. : 2 lit.
Sampling Team : MMRDL (Gaurav)
Sample Reg. No. : MMW/04-23/8.1-8.9
Date(s) of Sampling : 24-04-2023
Date(s) of Receipt : 25-04-2023
Date(s) of Testing : 25/04/2023 to 27/04/2023
Date of Report : 27-04-2023
Test Report No. : MMW/04-23/17
ULR Number : TC633723000000101F

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS				
	Acceptable	Permissible	.	Pond near northern side of Expansion area	Pond in Nimab-ahali Village	Brahma-ni River near Kushp-anga Village (Up Stream)	Brahma-ni River near Birho Village (Down Stream)	Rengali Right main Canal southern side of Expans-ion area
Temperature, ℃	-	-	IS 3025 (Part 9): 1984, RA 2017	28	29	26	26	27
Ammonical Nitrogen as NH_3, mg/l	-	-	APHA 23rd Ed. 4500-NH_3 C: 2017	BDL	1.12	BDL	BDL	BDL

NOTE : BDL(Below Detection Limit) of NH3<0.56 mg/l

Abbreviation: FWIM- Field Work Instruction Manual

Prepared By
Rashmi Gupta
Administrative Manager

Checked By
Dr. Marisha Sharma
Authorised Signatory

:: End of Report ::

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Phone: 25353238, 25353891, 25353569
Email: lab.mmrdl@gmail.com, Website: http://www.mmrdl.com
Recognised by MOEF&CC (Sr. No. 97 of S.O. 3744 (E) Dated 17/10/2018)

Test Report No. : MMW/04-23/18 .
ULR Number : - .

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address Rungta Mines Pvt. Ltd. (Ferro Alloys Division) Vill. - Tulasidiha, P.O. - Meramandali Dist. - Dhenkanal, Odisha - 759121 Contact Person: Mr. G.P. Sharma, Phone: 06582-256861							
Sample Particulars							
Type of Sample : Surface water							
Work Order No. : 4800028086							
Sampling location : In and around Expansion of Ferro Alloy Plant, Odisha							
Sampling Procedure : Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.12.2020							
Sample Vol./Qty. : 2 lit.							
Sampling Team : MMRDL (Gaurav)							
Sample Reg. No. : MMW/04-23/8.1-8.9							
Date(s) of Sampling : 24-04-2023							
Date(s) of Receipt : 25-04-2023							
Date(s) of Testing : 25/04/2023 to 28/04/2023							
Date of Report : 28-04-2023							
Test Report No. : MMW/04-23/18							
Parameters	**Drinking water limits (IS: 10500:2012, Amendment 3, 2021)**		**Protocol**	**TEST RESULTS**			
	Acceptable	**Permissible**	.	**Reservoir in Existing plant area**	**Pond in Chararha-gadia**	**Lingra nadi near Gandijh-ara Village (Up Stream)**	**Lingra Nadi near Motanga Village (Down Stream)**
Total Kjeldahl Nitrogen (TKN), mg/l	-	-	APHA 23rd Ed. 4500-NH3 C: 2017	8.96	5.6	26.88	10.08
Sodium Adsorption Ratio (SAR) mg/l	-	-	IS 11624-1986	1.85	1.81	2.93	2.69
Faecal Coliform	-	-	APHA 23rd Ed. 9221 E: 2017	Absent	Absent	Absent	Absent

NOTE : BDL(Below Detection Limit) of TKN<1.12 mg/l

Abbreviation: FWIM- Field Work Instruction Manual

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Recognised by MOEF&CC (Sr. No. 97 of S.O. 3744 (E) Dated 17/10/2018)

Test Report No. : MMW/04-23/18 .

ULR Number : - .

ANNEXURE : V Contd..

TEST REPORT

Customer's Name & Address
Rungta Mines Pvt. Ltd. (Ferro Alloys Division)
Vill. - Tulasidiha, P.O. - Meramandali
Dist. - Dhenkanal, Odisha - 759121
Contact Person: Mr. G.P. Sharma, Phone: 06582-256861

Sample Particulars

Type of Sample : Surface water
Work Order No. : 4800028086
Sampling location : In and around Expansion of Ferro Alloy Plant, Odisha
Sampling Procedure : Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.12.2020
Sample Vol./Qty. : 2 lit.
Sampling Team : MMRDL (Gaurav)
Sample Reg. No. : MMW/04-23/8.1-8.9
Date(s) of Sampling : 24-04-2023
Date(s) of Receipt : 25-04-2023
Date(s) of Testing : 25/04/2023 to 28/04/2023
Date of Report : 28-04-2023
Test Report No. : MMW/04-23/18

Parameters	Drinking water limits (IS: 10500:2012, Amendment 3, 2021)		Protocol	TEST RESULTS				
	Acceptable	Permissible	.	Pond near northern side of Expansion area	Pond in Nimab-ahali Village	Brahma-ni River near Kushp-anga Village (Up Stream)	Brahma-ni River near Birho Village (Down Stream)	Rengali Right Main Canal southern side of Expans-ion area
Total Kjeldahl Nitrogen (TKN), mg/l	-	-	APHA 23rd Ed. 4500-NH3 C: 2017	2.24	3.36	BDL	BDL	2.24
Sodium Adsorption Ratio (SAR) mg/l	-	-	IS 11624-1986	0.94	2.71	0.35	0.53	0.41
Faecal Coliform	-	-	APHA 23rd Ed. 9221 E: 2017	Absent	Abse-nt	Absent	Absent	Absent

NOTE : BDL(Below Detection Limit) of TKN<1.12 mg/l

Abbreviation: FWIM- Field Work Instruction Manual

Prepared By
Rashmi Gupta
Administrative Manager

Checked By
Dr. Marisha Sharma
Authorised Signatory

:: End of Report ::

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ANNEXURE : VI

CPCB's Water Quality Criteria

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	• Total Coliforms Organism MPN/100ml shall be 50 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 6 mg/l or more • Biochemical Oxygen Demand 5 days 20°C 2 mg/l or less
Outdoor bathing (Organised)	B	• Total Coliforms Organism MPN/100 ml shall be 500 or less • pH between 6.5 and 8.5 • Dissolved Oxygen 5 mg/l or more • Biochemical Oxygen Demand 5 days 20°C 3 mg/l or less
Drinking water source after conventional treatment and disinfection	C	• Total Coliforms Organism MPN/100ml shall be 5000 or less • pH between 6 to 9 • Dissolved Oxygen 4 mg/l or more • Biochemical Oxygen Demand 5 days 20°C 3 mg/l or less
Propagation of Wild life and Fisheries	D	• pH between 6.5 to 8.5 • Dissolved Oxygen 4 mg/l or more • Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	• pH between 6.0 to 8.5 • Electrical Conductivity at 25°C micro mhos/cm Max.2250 • Sodium absorption Ratio Max. 26 • Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

Source: https://cpcb.nic.in/water-quality-criteria/ updated by CPCB on 11 Oct 20219

Drinking water standards IS 10500 : 2012

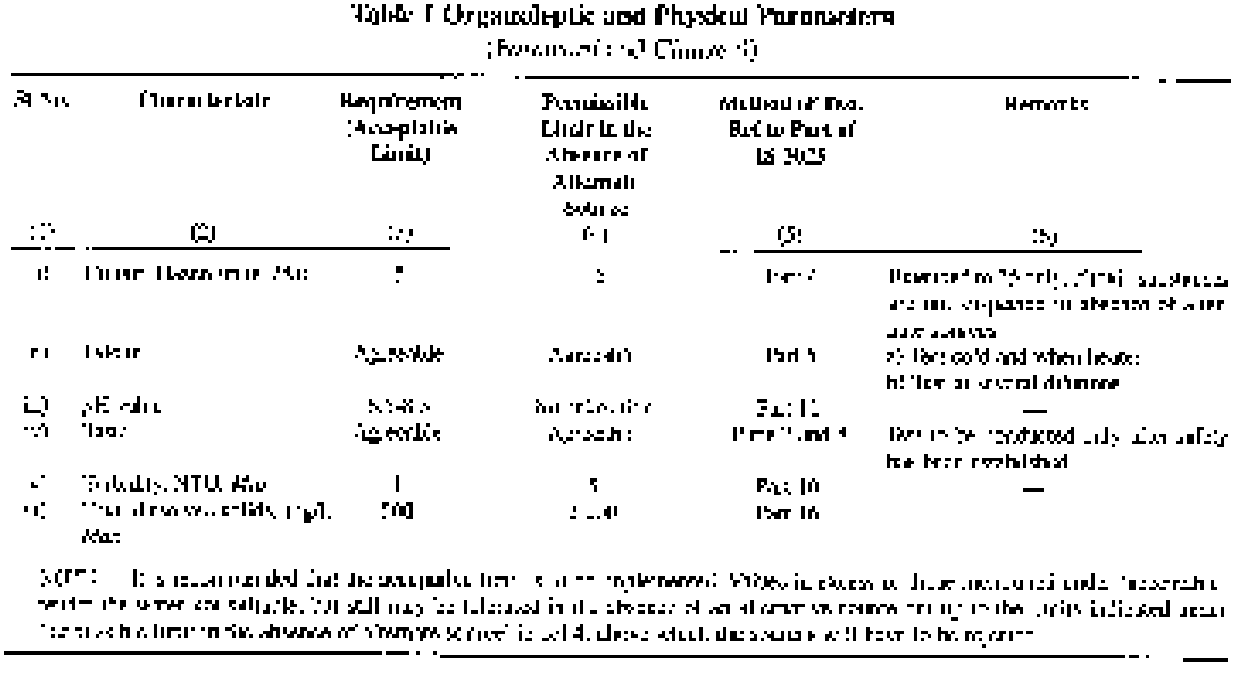


Table 2 General Parameters Concerning Substances Undesirable in Excessive Amounts
(*Foreword* and *Clause* 4)

SL No	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Aluminium (as Al), mg/l, Max	0.03	0.2	IS 3025 (Part 55)	—
ii)	Ammonia (as total ammonia-N), mg/l, Max	0.5	No relaxation	IS 3025 (Part 34)	—
iii)	Anionic detergent (as MBAS), mg/l, Max	0.2	1.0	Annex K of IS 13428	—
iv)	Barium (as Ba), mg/l, Max	0.7	No relaxation	Annex F of IS 15302 or IS 15306	—
v)	Boron (as B), mg/l, Max	0.5	1.0	IS 3025 (Part 57)	—
vi)	Calcium (as Ca), mg/l, Max	75	200	IS 3025 (Part 40)	—
vii)	Chlorides (as Cl), mg/l, Max	250	No relaxation	IS 3025 (Part 32) or APHA 4500-Cl B	—
viii)	Chromium (as Cr6+), mg/l, Max	0.05	1.00	IS 3025 (Part 52)	—
ix)	Copper (as Cu), mg/l, Max	0.05	1.5	IS 3025 (Part 42)	—
x)	Fluoride (as F), mg/l, Max	1.0	1.5	IS 3025 (Part 60)	—
xi)	Free residual chlorine, mg/l, Min	0.2		IS 3025 (Part 26)	To be applicable only when water is chlorinated. Test at consumer end. When protection against viral infection is required, it should be minimum 0.5 mg/l
xii)	Iron (as Fe), mg/l, Max	0.3	No relaxation	IS 3025 (Part 53)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xiii)	Magnesium (as Mg), mg/l, Max	30	100	IS 3025 (Part 46)	
xiv)	Manganese (as Mn), mg/l, Max	0.1	0.3	IS 3025 (Part 59)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xv)	Mineral oil, mg/l, Max	0.5	No relaxation	Clause 6 of IS 3025 (Part 39); solvent partition method	
xvi)	Nitrate (as NO_3), mg/l, Max	45	No relaxation	IS 3025 (Part 34)	—
xvii)	Phenolic compounds (as C_6H_5OH), mg/l, Max	0.001	0.002	IS 3025 (Part 43)	—
xviii)	Selenium (as Se), mg/l, Max	0.01	No relaxation	IS 3025 (Part 56) or IS 15303	—
xix)	Silver (as Ag), mg/l, Max	0.1	No relaxation	Annex J of IS 13428	—
xx)	Sulphate (as SO_4), mg/l, Max	200	400	IS 3025 (Part 24)	May be relaxed to 400 provided that Magnesium does not exceed 30
xxi)	Sulphide (as H_2S), mg/l, Max	0.05	No relaxation	IS 3025 (Part 29)	—
xxii)	Total alkalinity as Calcium carbonate, mg/l, Max	200	600	IS 3025 (Part 23)	—
xxiii)	Total hardness (as $CaCO_3$), mg/l, Max	200	600	IS 3025 (Part 21)	—
xxiv)	Zinc (as Zn), mg/l, Max	5	15	IS 3025 (Part 49)	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the reference method.

2 It is recommended that the acceptable limits may be implemented. Where no source is available, the limit specified under 'acceptable' in the appropriate column may be relaxed in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the source will have to be rejected.

Table 3 Parameters Concerning Toxic Substances
(*Foreword* and *Clause* 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Cadmium (as Cd), mg/l, Max	0.003	No relaxation	IS 3025 (Part 41)	
ii)	Cyanide (as CN), mg/l, Max	0.05	No relaxation	IS 3025 (Part 27)	—
iii)	Lead (as Pb), mg/l, Max	0.01	No relaxation	IS 3025 (Part 47)	—
iv)	Mercury (as Hg), mg/l, Max	0.001	No relaxation	IS 3025 (Part 48) Mercury analyser	—
v)	Molybdenum (as Mo), mg/l, Max	0.07	No relaxation	IS 3025 (Part 2)	—
vi)	Nickel (as Ni), mg/l, Max	0.02	No relaxation	IS 3025 (Part 54)	—
vii)	Selenium, µg/l, Max	See Table 5	No relaxation	See Table 5	—
viii)	Polynuclear aromatic hydrocarbons, mg/l, Max	0.0001	Not permissible	Annex B of IS 13428 or APHA 6440	—
ix)	Polynuclear aromatic hydrocarbons (as PAH), mg/l, Max	0.0001	No relaxation	APHA 6440	—
x)	Total arsenic (as As), mg/l, Max	0.01	0.05	IS 3025 (Part 37)	—
xi)	Total chromium (as Cr), mg/l, Max	0.05	No relaxation	IS 3025 (Part 52)	—
xii)	Pesticides, mg/l				
	a) Aldrin/dieldrin, mg/l, Max	0.1	No relaxation	ASTM D 3086-85* or APHA 6630	—
	b) Dichlorodiphenyltrichloroethane, mg/l, Max	0.1	No relaxation	ASTM D 3086-85* or APHA 6630	—
	c) Endosulfan (α, β and sulphate), mg/l, Max	0.04	No relaxation	ASTM D 3086-85* or APHA 6630	—
	d) Chlordane, mg/l, Max	0.2	No relaxation	ASTM D 3086-85* or APHA 6630	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table 4 Parameters Concerning Radiological Substances
(*Foreword* and *Clause* 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 14194	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Radioactive materials:				
	a) Alpha emitters Bq/l, Max	0.1	No relaxation	Part 2	—
	b) Beta emitters Bq/l, Max	1.0	No relaxation	Part 1	—

NOTE It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Amendment 1	***June 2015***	[*Page* 2, *Table* 2, *Sl No.* xii), *col* 3] —Substitute '1.0' *for* '0.3'. [*Page* 3, *Table* 3, *Sl No.* x) , *col* 4] —Substitute 'No relaxation' *for* '0.05'.
Amendment 2	***September 2018***	(*Page* 1, *clause* **4.1.1**, *line* 6) — Substitute 'IS 15185' *for* 'IS 1622'. [*Page* 2, *Table* 2, *Sl No*. (v), *col* 4] — Substitute '2.4' *for* '1.0'.
Amendment 3	***February 2021***	[*Page* 2, *Table* 2, *Sl. No.* (xv), *col* 3] — Substitute '1.0' *for* '0.5'. (*Page* 2, *Table* 2, *Notes*) — Substitute the following for the existing Notes: 'NOTES **1** Approved and validated international test methods from ISO/ APHA/ ASTM/ AOAC/ EPA/ EN may also be followed. **2** In case of dispute, methods given at column 5 and wherever indicated by '*' shall be the referee method. **3** It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.'

(*Page* 3, *Table* 3) — Insert the following new entry at the end:

Table 3

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
xiii)	Uranium, mg/l, *Max*	0.03	No relaxation	IS 3025 (Part 65)	—

(*Page* 3, *Table* 3, *Notes*) — Substitute the following for the existing:

'NOTES

1 Approved and validated international test methods from ISO/ APHA/ ASTM/ AOAC/ EPA/ EN may also be followed.

2 In case of dispute, methods given at column 5 and wherever indicated by '*' shall be the referee method.

3 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.'

(*Page* 5, *clause* **4.2.7**) — Substitute the following for the existing clause:

'4.2.7 MS2 phage are indicators of viral contamination in drinking water and have been taken as representatives for presence of viruses for the purpose in this standard. MS2 phage shall be absent in 1 litre of water when tested in accordance with USEPA method 1601 or USEPA method 1602. In case of dispute, USEPA method 1602 shall be the referee method.

NOTE (for guidance purpose only) — If MS2 phage are detected in the drinking water, the virological examination is to be done by the Polymerase Chain Reaction (PCR) method as given in Annex B or the USEPA method in Manual of Method for Virology Chapter 16, June 2001. If viruses are detected, the cause must be determined by immediate further investigation by the concerned authorities.'

(*Page* 5, *clause* **4.2.7**) — Insert the following new clause:

'**4.2.8** The information given in clauses **4.2.1** to **4.2.6** is for guidance purposes only.'

(*Page 6, clause* **4.3.10**) — Substitute the following for the existing clause:

'4.3.10 The drinking water is expected to be free from microscopic organisms such as algae, zooplanktons, flagellates, parasites and toxin producing organisms. An illustrative (and not exhaustive) list is given in Annex C for guidance.'

(*Page* 6, *clause* **4.3.10**) — Insert the following after clause **4.3.10**:

'4.3.11 The information given in clauses **4.3.1** to **4.3.7** and **4.3.10** is for guidance purposes only.'

(*Page* 6, *clause* **5**) — Substitute the following for the existing clause:

'5 SAMPLING

Representative samples of water shall be drawn as prescribed in IS 1622 and IS 3025 (Part 1). For bacteriological requirements, representative samples of water shall be drawn as given in IS 15185.'

(*Page* 6, *Annex* A) — Insert the following new entries at appropriate places:

IS No.	*Title*
3025 (Part 65) : 2014	Methods of sampling and test (physical and chemical) for water and waste water : Part 2 Application of inductively coupled plasma mass spectrometry (ICP-MS) — Determination of 62 elements
15185 : 2016	Water quality — Detection and enumeration of *Escherichia coli* and coliform bacteria — Membrane filtration method for water with low bacterial background flora (*first revision*)

Amendment 4	***November 2021***	[*Page* 3, *Table* 3, *Sl. No*. (xiii), *col* 5 (*see also Amendment No*. 3)] — Substitute 'IS 3025 (Part 65)* or IS 14194 (Part 3)' for 'IS 3025 (Part 65)'. (*Page* 6, *Annex* A) — Insert the following reference at appropriate place: *IS No.* — *Title* 14194 (Part 3) : 2021 — Radionuclides in environmental samples — Method of estimation: Part 3 Uranium (*first revision*)

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Recognised by MOEF&CC (Sl.No.97 of S.O.3744(E) dated 17/10/2019)

ANNEXURE : VII

TEST REPORT

Customer's Name & Address		
Rungta Mines Ltd. (Ferro Alloys Division) Village- Tulasidiha, P.O.- Meramandali Dist.- Dhenkanal, Odisha- 759121 Contact Person: Mr. G. P. Sharma, Phone: 06582-256861		
Sample Particulars		
Type of Sample	:	Noise
Work Order No.	:	4800028086
Sampling Location	:	In and around Expansion of Ferro Alloys Plant, Odisha
Sampling Procedure	:	Section 3.0, of FWIM, dated 15.12.2020
Sample Duration	:	24 hours
Sampling Team	:	MMRDL (Gaurav)
Sample Reg. No.	:	MMN/06-22/3.1-3.8
Date(s) of Monitoring	:	19/05/2022 to 27/05/2022
Date(s) of Receipt	:	04/06/2022
Date(s) of Report	:	06/06/2022
Test Report No.	:	MMN/06-22/17
ULR No.	:	TC633722000000083F
Page	:	1 of 2

Hours↓	**Existing Plant area (Admin Building)**	**Chararhagarhia Village**	**Bhanuparha Village**	**Jharhabandh Village**
Date of Monitoring→	**19-20/05/2022**	**20-21/05/2022**	**21-22/05/2022**	**22-23/05/2022**
Day Time : 6 am to 10 pm				
6-7 am	64.6	52.2	48.4	49.4
7-8 am	61.8	50.1	52.0	52.6
8-9 am	66.7	53.4	54.7	53.4
9-10 am	68.5	53.1	52.7	52.3
10-11 am	63.5	53.1	51.7	50.6
11-12 am	67.3	50.1	51.9	49.4
12-1 pm	65.3	48.4	52.2	51.7
1-2 pm	67.2	53.1	51.7	53.9
2-3 pm	64.3	54.4	48.3	54.3
3-4 pm	61.3	52.6	52.4	48.9
4-5 pm	66.0	53.9	46.5	54.3
5-6 pm	61.8	51.1	50.3	54.5
6-7 pm	61.0	50.4	48.5	48.6
7-8 pm	60.5	46.6	50.1	45.1
8-9 pm	63.2	46.0	50.1	48.5
9-10 pm	60.8	52.2	43.6	46.1
Night Time : 10 pm to 6 am				
10-11 pm	56.3	44.5	40.1	41.3
11-12 pm	56.7	41.5	40.7	42.6
12-1 am	54.2	44.4	39.2	40.3
1-2 am	58.5	41.4	42.8	42.6
2-3 am	57.8	42.1	40.2	38.5
3-4 am	56.6	41.6	40.7	41.6
4-5 am	57.3	38.8	41.2	40.2
5-6 am	58.7	39.9	38.4	42.7
Day time Leq.	**65.18**	**52.06**	**51.12**	**51.74**
Night time Leq.	**57.20**	**42.16**	**40.59**	**41.43**

NOTES :

- *The results indicated only refer to the tested samples and listed parameters and do not endorse any product*
- *Total liability of the laboratory is limited to the invoice amount*
- *This certificate shall not be reproduced wholly or in part without prior written consent of the laboratory*
- *Unused balance of samples received shall be destroyed after one month from the date of issue of test report, unless other wise specified*
- *This report shall not be used in any advertising media or as evidence in the court of law without prior written consent of the laboratory*
- *Complaint register is available with the laboratory , in case required*

Min Mec R&D Laboratory
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Recognised by MOEF&CC (Sl.No.97 of S.O.3744(E) dated 17/10/2019)

ANNEXURE : VII Contd..

Hours↓	Naraharipur Shasan Village	Motanga Village	Meramundali Bazar	Gandijhara Village
Date of Monitoring→	**23-24/05/2022**	**24-25/05/2022**	**25-26/05/2022**	**26-27/05/2022**
Day Time : 6 am to 10 pm	46.9	48.6	61.3	52.0
6-7 am	50.7	50.2	59.3	53.3
7-8 am	52.2	45.2	62.7	52.6
8-9 am	53.2	48.3	60.3	50.3
9-10 am	47.7	48.1	59.5	51.1
10-11 am	51.1	51.4	62.0	54.7
11-12 am	47.9	50.7	63.4	54.6
12-1 pm	49.4	54.5	62.4	51.0
1-2 pm	51.0	51.1	58.7	51.9
2-3 pm	53.8	48.3	60.2	52.3
3-4 pm	51.0	52.1	61.7	55.6
4-5 pm	50.7	52.1	63.7	54.8
5-6 pm	50.9	47.1	61.3	56.2
6-7 pm	43.0	45.0	55.2	47.8
7-8 pm	46.7	43.7	56.2	48.5
8-9 pm	43.0	46.9	54.9	51.8
9-10 pm	46.9	48.6	61.3	52.0
Night Time : 10 pm to 6 am				
10-11 pm	41.7	43.5	49.6	45.0
11-12 pm	38.1	38.7	49.5	43.0
12-1 am	37.3	41.9	49.1	42.9
1-2 am	36.9	38.6	51.5	40.5
2-3 am	39.8	40.8	48.9	40.5
3-4 am	40.5	38.6	49.2	41.6
4-5 am	39.7	42.8	51.6	41.6
5-6 am	40.2	41.9	50.1	42.9
Day time Leq.	**50.14**	**50.04**	**61.12**	**53.01**
Night time Leq.	**39.55**	**41.24**	**50.06**	**42.49**

Category of area	Ambient Air Quality Standards in Respect of Noise in db (A) Leq as per Noise Pollution (Regulation and Control) Rules 2000	
	Day time	Night time
Industrial area	75	70
Commercial area	65	55
Residential area	55	45
Silence zone	50	40

Source: Pollution Control Acts, Rules and Notifications Issued Thereunder, Pollution Control Law Series: PCLS/02/2010 (Sixth edition) of Central Pollution Control Board, June -2010, Page 1117
Abbreviation: FWIM- Field Work Instruction Manual

Prepared by

Rashmi Gupta
Administrative Manager

Checked by

Dr. Marisha Sharma
Authorised Signatory

- end of report –

NOTES :

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- *This certificate shall not be reproduced wholly or in part without prior written consent of the laboratory*
- *Unused balance of samples received shall be destroyed after one month from the date of issue of test report, unless other wise specified*
- *This report shall not be used in any advertising media or as evidence in the court of law without prior written consent of the laboratory*
- *Complaint register is available with the laboratory , in case required*

ANNEXURE : VIII

THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000

SCHEDULE

[See Rule 3(1) and 4(1)]

Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area/Zone	Limits in dB(A) Leq*	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note :

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.

2. Night time shall mean from 10.00 p.m. to 6.00 a.m.

[a][3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority].

4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale 'A' which is relatable to human hearing.

A "decibel" is a unit in which noise is measured.

"A", in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq : It is an energy mean of the noise level over a specified period.

SOURCE : Pollution Control Acts, Rules and Notifications Issued Thereunder, Pollution Control Law Series : PCLS/02/1992 (Fourth Edition) of Central Pollution Control Board, September 2001, pp 711

[a] Substituted by Rule 4 of the Noise Pollution (Regulation and Control) (Amendment) Rules, 2000 notified vide S.O. 1046(E), dated 22.11.2000.

ANNEXURE : VIII Contd..

SCHEDULE XXIV OF MODEL RULES UNDER THE FACTORIES ACT, 1948
(Corrected up to 01-3-2019)

PART -A HIGH NOISE LEVELS

Table 1: Permissible exposure in cases of continuous noise

Total time of exposure (continuous short term exposures)	Sound pressure level in or a number of dBA per day, in hours
8	85
6	87
4	90
3	92
2	95
1 ½	97
1	100
3/4	102
½	105
1/4	110

Notes : 1. No exposure in excess of 110 dBA is to be permitted.
2. For any period of exposure falling in between any figure and the next higher or lower figure as indicated in column 1, the permissible sound pressure level is to be determined by extrapolation on a proportionate basis.

Table 2: Permissible exposure levels of impulsive or impact noise

Peak sound pressure level in dB	Permitted number of impulses or impact per day
140	100
135	315
130	1,000
125	3,160
120	10,000

Notes: 1.No exposure in excess of 140 dB peak sound pressure level is permitted
2. For any peak sound pressure level falling in between any figure and the next higher or lower figure as indicated in column 1, the permitted number of impulses or impacts per day is to be determined by extrapolation on a proportionate basis.

PART-B HIGH VIBRATION LEVELS

Exposure limit values and action values :

(1) For hand-arm vibration—

(a) the daily exposure limit value is 5 m/s2A(8);

(b) the daily exposure action value is 2.5 m/s2A(8), and daily exposure shall be ascertained on the basis set out in the relevant National/International Standards specified in table 1 below.

(2) For whole body vibration—

(a) the daily exposure limit value is 1.15 m/s2A(8);

(b) the daily exposure action value is 0.5 m/s2A(8), and daily exposure shall be ascertained on the basis set out in the relevant National/International Standards

Table 1:The Threshold Limit Values (TLVs) for exposure of the hand to vibration in X, Y, or Z direction of axes in the three dimensional system shall be as given below:

Total Daily Exposure Duration (hours)	Maximum value of frequency weighted acceleration (m/s2) in any direction
4 to less than 8 hours	4
2 to less than 4 hours	6
1 to less than 2 hours	8
less than 1hour	12

TRAFFIC VOLUME MONITORING DATA
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Traffic Census Point	Type of Vehicle	Hour																								Total	Equivalency Factor, PCU	Traffic Volume, PCU/day
		7:00-8:00	8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00	19:00-20:00	20:00-21:00	21:00-22:00	22:00-23:00	23:00-24:00	24:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00	06:00-07:00			
CP: 01		**Up Direction, Traffic Count per day**																										
Angul to Dhenknal (Near Nimabahali Bazar Village)	Cycle	7	21	17	23	11	10	13	14	20	22	8	15	7	2	1	0	0	0	0	0	0	1	3	6	**201**	0.5	101
	Motor cycles and scooters	151	195	112	163	149	130	158	169	182	197	114	234	181	103	52	18	5	2	0	0	0	15	38	67	**2435**	0.5	1218
	LMV (car, jeep, van, 3-W, etc)	71	96	65	86	84	133	121	147	128	138	113	80	104	68	35	24	12	9	3	1	4	18	28	46	**1614**	1	1614
	Buses	4	7	8	9	9	11	6	12	12	11	10	8	5	4	3	2	3	1	2	0	1	2	3	2	**135**	3	405
	Trucks	114	128	121	152	130	226	213	217	248	260	186	194	171	150	161	145	132	86	68	61	75	94	102	121	**3555**	3	10665
	Animal drawn vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	8	0
	Others (Tractor)	2	3	4	18	9	6	4	14	5	12	7	6	2	0	0	0	0	0	0	0	0	0	1	2	**95**	1.5	143
	Sub-Total (Up)	**349**	**450**	**327**	**451**	**392**	**516**	**515**	**573**	**595**	**640**	**438**	**537**	**470**	**327**	**252**	**189**	**152**	**98**	**73**	**62**	**80**	**130**	**175**	**244**	**8035**		**14146**
		Down Direction, Traffic Count per day																										
	Cycle	7	31	16	43	38	6	21	26	6	12	18	17	5	0	0	0	0	0	0	0	0	0	3	5	**254**	0.5	127
	Motor cycles and scooters	145	203	181	160	180	161	174	204	116	98	166	170	103	65	40	15	3	1	0	0	0	17	42	73	**2317**	0.5	1159
	LMV (car, jeep, van, 3-W, etc)	81	107	79	134	168	120	167	177	133	103	94	64	82	58	31	21	15	6	5	2	5	23	24	41	**1740**	1	1740
	Buses	5	7	8	7	11	6	9	7	7	6	9	6	5	3	3	2	3	2	3	1	2	2	3	3	**120**	3	360
	Trucks	169	141	162	168	201	194	295	327	228	180	193	114	122	148	163	131	142	81	76	54	65	89	98	129	**3670**	3	11010
	Animal drawn vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	8	0
	Others (Tractor)	2	4	5	14	16	4	7	11	6	3	6	2	1	0	0	0	0	0	0	0	0	0	0	1	**82**	1.5	123
	Sub-Total (Down)	**409**	**493**	**451**	**526**	**614**	**491**	**673**	**752**	**496**	**402**	**486**	**373**	**318**	**274**	**237**	**169**	**163**	**90**	**84**	**57**	**72**	**131**	**170**	**252**	**8183**		**14519**
	Grand Total (Up-Down)	**758**	**943**	**778**	**977**	**1006**	**1007**	**1188**	**1325**	**1091**	**1042**	**924**	**910**	**788**	**601**	**237**	**358**	**315**	**188**	**157**	**119**	**152**	**261**	**345**	**496**	**16218**		**28665**

Traffic Census Point	Type of Vehicle	Hour																								Total	Equivalency Factor, PCU	Traffic Volume, PCU/day
		7:00-8:00	8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00	19:00-20:00	20:00-21:00	21:00-22:00	22:00-23:00	23:00-24:00	24:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00	06:00-07:00			
CP: 02		**Up Direction, Traffic Count per day**																										
NH-55 to Plant	Cycle	14	41	22	9	7	4	8	13	20	21	38	18	5	1	0	0	0	0	0	0	0	0	2	7	**230**	0.5	115
	Motor cycles and scooters	18	36	28	14	11	13	9	15	17	22	29	23	19	7	2	0	0	0	0	0	0	0	3	4	**270**	0.5	135
	LMV (car, jeep, van, 3-W, etc)	0	3	3	1	1	2	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**16**	1	16
	Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	3	0
	Trucks	0	0	0	2	0	1	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	3	24
	Animal drawn vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	8	0
	Others	1	1	0	0	1	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**7**	1.5	11
	Sub-Total (Up)	**33**	**81**	**53**	**26**	**20**	**22**	**19**	**29**	**42**	**48**	**67**	**41**	**24**	**8**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**11**	**531**		**301**
		Down Direction, Traffic Count per day																										
	Cycle	15	11	18	21	12	9	7	14	16	21	45	23	5	3	0	0	0	0	0	0	0	0	2	5	**227**	0.5	114
	Motor cycles and scooters	13	14	12	34	15	11	16	13	26	27	36	19	14	5	1	0	0	0	0	0	0	0	1	2	**259**	0.5	130
	LMV (car, jeep, van, 3-W, etc)	0	1	1	1	2	2	0	1	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**14**	1	14
	Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	3	0
	Trucks	0	0	0	2	0	1	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	3	24
	Animal drawn vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	8	0
	Others	1	1	0	1	0	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**8**	1.5	12
	Sub-Total (Down)	**29**	**27**	**31**	**59**	**29**	**25**	**26**	**28**	**47**	**54**	**81**	**42**	**19**	**8**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**7**	**516**		**294**
	Grand Total (Up-Down)	**62**	**108**	**84**	**85**	**49**	**47**	**45**	**57**	**89**	**102**	**148**	**83**	**43**	**16**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**8**	**18**	**1047**		**595**

Source: Min Mec R&D Laboratory, New Delhi

POPULATION AND LANDUSE OF 10KM STUDY AREA, CENSUS 2011 (Ha)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	Population	Total area	Forest land	Area under Non-Agricultural Uses	Barren & Un-cultivable Land	Permanent Pastures and Other Grazing Land	Land Under Misc. Tree Crops etc.	Culturable Waste Land	Fallows Land other than Current Fallows	Current Fallows	Net Area Sown	Total Unirrigated Land	Area Irrigated by Source	Canals	Wells/ Tube Wells	Tanks/Lakes	Waterfall	Other Source
District	**Dhenkanal**																		
Tehsil	**Parjang**																		
402286	Palasahi	1283	410.00	12.02	88.07	0.00	8.36	1.77	2.68	21.69	5.58	269.83	269.83	0.00	0.00	0.00	0.00	0.00	0.00
402287	Dihakamar	286	96.00	0.87	19.54	0.00	2.36	0.00	0.00	0.00	1.50	71.73	67.60	4.13	4.13	0.00	0.00	0.00	0.00
402288	Patarapada	3069	694.00	19.87	64.35	0.00	21.28	7.30	8.16	52.74	13.84	506.46	388.15	118.31	118.31	0.00	0.00	0.00	0.00
402289	Sankamar	657	31.00	0.00	2.97	5.56	0.06	0.00	0.00	0.13	0.01	22.27	22.27	0.00	0.00	0.00	0.00	0.00	0.00
402290	Gailo	854	212.00	5.54	17.08	43.35	3.57	6.72	1.24	3.01	0.00	131.49	99.75	31.74	31.74	0.00	0.00	0.00	0.00
402291	Kundandeipur	598	154.00	0.00	24.31	16.75	0.00	1.82	1.40	2.47	0.00	107.25	73.59	33.66	33.66	0.00	0.00	0.00	0.00
402292	Panibhandar	1129	248.00	14.07	2.62	36.96	8.19	0.98	0.00	2.89	0.02	182.27	182.27	0.00	0.00	0.00	0.00	0.00	0.00
402293	Badakamar	521	88.00	0.00	20.56	0.00	0.73	0.60	1.59	0.00	0.76	63.76	36.46	27.30	27.30	0.00	0.00	0.00	0.00
402294	Katabahal	2372	233.00	6.34	32.39	1.49	12.29	2.88	5.00	1.65	5.51	165.45	162.82	2.63	2.63	0.00	0.00	0.00	0.00
402305	Roda	2190	503.00	10.47	113.28	52.84	8.24	0.49	0.00	7.07	0.00	310.61	288.04	22.57	22.57	0.00	0.00	0.00	0.00
402308	Siarimalia	588	151.00	1.33	24.40	11.58	2.85	2.17	0.00	1.49	0.00	107.18	107.18	0.00	0.00	0.00	0.00	0.00	0.00
	Sub total	**13547**	**2820.00**	**70.51**	**409.57**	**168.53**	**67.93**	**24.73**	**20.07**	**93.14**	**27.22**	**1938.30**	**1697.96**	**240.34**	**240.34**	**0.00**	**0.00**	**0.00**	**0.00**
Tehsil	**Odapada**																		
402897	Kusupanga	1911	107.00	0.00	46.47	48.41	1.99	0.01	0.28	5.63	4.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402898	Kurunti	2910	649.00	12.57	275.63	226.62	21.53	0.02	2.24	88.16	22.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402899	Kochilamada	1114	127.00	0.00	31.56	81.50	1.16	0.00	0.96	4.84	6.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402901	Charadagadia	835	104.00	6.58	21.11	58.88	3.34	0.00	1.63	11.59	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402902	Tulasidihi	16	41.00	0.53	23.29	8.16	1.54	0.04	0.00	3.70	3.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402904	Ghantalapasi	20	14.00	0.00	4.38	7.74	0.00	0.01	0.00	1.31	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402905	Motunga	1883	157.00	0.00	84.01	65.40	1.02	0.01	0.00	2.84	3.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402906	Kharagprasad	4507	1313.00	73.51	192.05	419.69	61.21	113.95	26.83	278.12	147.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402907	Kharagprasadpatna	1696	16.00	0.00	3.35	0.00	0.21	0.01	11.78	0.61	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402908	Suravi	765	179.00	0.00	48.15	124.64	2.75	0.01	0.00	3.04	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402909	Bido	1407	272.00	0.00	42.60	88.11	1.26	1.29	0.03	2.71	0.00	136.00	136.00	0.00	0.00	0.00	0.00	0.00	0.00
402910	Taladanga	438	45.00	0.00	4.16	15.95	0.80	0.01	0.00	1.09	0.49	22.50	22.50	0.00	0.00	0.00	0.00	0.00	0.00
402911	Ranjasinga	1256	112.00	0.00	28.69	42.55	0.73	0.03	0.11	23.67	16.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402912	Rangathali	52	31.00	2.00	12.31	14.21	1.55	0.00	0.00	0.50	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402913	Nagari	940	103.00	0.00	29.33	42.50	2.86	0.00	0.10	15.56	12.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402914	Gaudapasi	124	131.00	0.00	5.75	53.07	0.39	0.05	0.00	4.05	2.19	65.50	65.50	0.00	0.00	0.00	0.00	0.00	0.00
402915	Chintapokhari	775	93.00	0.00	13.57	70.04	1.27	0.00	0.15	5.73	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402916	Malibido	674	123.00	0.36	16.83	40.10	0.16	0.01	0.03	1.77	2.24	61.50	61.50	0.00	0.00	0.00	0.00	0.00	0.00
402917	Binakarkateni	587	76.00	0.00	9.61	62.46	0.48	0.03	0.02	2.96	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402918	Budhapanka	669	97.00	0.87	21.44	18.58	1.53	0.00	0.08	3.69	2.31	48.50	48.50	0.00	0.00	0.00	0.00	0.00	0.00
402919	Brajabiharipur	230	125.00	0.00	34.73	77.88	0.02	0.00	0.02	4.16	3.51	4.68	4.68	0.00	0.00	0.00	0.00	0.00	0.00
402920	Salapada	63	51.00	0.00	3.35	16.09	0.03	0.00	0.00	4.44	1.59	25.50	25.50	0.00	0.00	0.00	0.00	0.00	0.00
402922	Kunjabiharipur	531	240.00	0.33	39.24	58.17	0.19	0.00	0.26	13.96	7.85	120.00	120.00	0.00	0.00	0.00	0.00	0.00	0.00
402930	Uparbaghalunda	955	157.00	0.00	11.47	43.05	3.21	0.00	0.15	8.22	12.29	78.61	51.52	27.09	27.09	0.00	0.00	0.00	0.00
402931	Nayabhagirathipur(Ea	1254	135.00	0.00	5.75	21.93	1.55	0.00	0.36	19.80	18.26	67.35	67.35	0.00	0.00	0.00	0.00	0.00	0.00
402932	Nayabhagirathipur(We	1027	99.00	0.00	9.00	22.37	0.00	0.00	0.00	0.00	14.12	53.51	53.51	0.00	0.00	0.00	0.00	0.00	0.00
402933	Kalusahukateni	753	176.00	1.88	14.07	64.71	3.89	1.00	0.48	1.60	0.37	88.00	88.00	0.00	0.00	0.00	0.00	0.00	0.00
402934	Haladibahali	1662	384.00	2.38	38.59	133.48	6.00	0.00	0.21	6.68	4.62	192.04	192.04	0.00	0.00	0.00	0.00	0.00	0.00
402935	Budhipahad	492	211.00	61.34	11.45	0.88	0.00	0.03	32.39	103.07	0.00	1.84	1.84	0.00	0.00	0.00	0.00	0.00	0.00
402936	Uperpal	420	104.00	0.00	9.70	40.01	0.94	0.54	0.15	0.66	0.01	51.99	0.00	51.99	51.99	0.00	0.00	0.00	0.00
402937	Meramandali	1377	276.00	10.18	75.89	161.55	10.06	0.00	2.31	10.94	5.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402938	Nimidha	3118	1102.00	99.08	44.38	11.00	43.58	3.53	26.16	63.07	19.74	791.46	738.60	52.86	52.86	0.00	0.00	0.00	0.00

POPULATION AND LANDUSE OF 10KM STUDY AREA, CENSUS 2011 (Ha)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	Population	Total area	Forest land	Area under Non-Agricultural Uses	Barren & Un-cultivable Land	Permanent Pastures and Other Grazing Land	Land Under Misc. Tree Crops etc.	Culturable Waste Land	Fallows Land other than Current Fallows	Current Fallows	Net Area Sown	Total Unirrigated Land	Area Irrigated by Source	Canals	Wells/ Tube Wells	Tanks/Lakes	Waterfall	Other Source
402939	Ranibania	672	172.00	2.97	6.67	0.06	6.91	0.49	11.49	15.30	3.12	124.99	22.28	102.71	102.71	0.00	0.00	0.00	0.00
402940	Badalo	1355	243.00	0.00	14.13	0.00	8.91	2.34	10.91	27.39	1.51	177.81	90.50	87.31	87.31	0.00	0.00	0.00	0.00
402964	Kamalanga	4520	1108.00	50.19	461.86	204.60	29.75	5.93	0.86	237.82	116.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402967	Mangalpur	5448	1084.00	16.72	554.86	336.60	36.16	1.99	6.11	115.73	15.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402968	Itapa	335	65.00	8.43	18.35	30.90	3.81	0.00	0.97	1.46	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402969	Narendrapur	1940	279.00	27.94	129.99	46.05	0.00	8.03	2.17	12.52	52.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402970	Asanabania	221	71.00	2.50	23.41	32.34	0.00	0.00	1.20	2.74	8.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
402971	Sibapur	1813	419.00	21.74	234.17	113.28	17.53	9.69	0.98	9.52	12.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub total	**50765**	**10291.00**	**402.10**	**2655.35**	**2903.56**	**278.32**	**149.05**	**141.42**	**1120.65**	**528.77**	**2111.78**	**1789.82**	**321.96**	**321.96**	**0.00**	**0.00**	**0.00**	**0.00**
Tehsil	**Hindol**																		
402972	Rakala	636	218.00	6.15	0.23	7.85	10.74	0.00	0.00	0.00	0.22	192.81	192.81	0.00	0.00	0.00	0.00	0.00	0.00
402973	Panaghudughuda	344	152.00	1.83	1.59	14.28	9.72	0.00	0.00	0.00	0.32	124.26	124.26	0.00	0.00	0.00	0.00	0.00	0.00
402974	Amana	1421	304.00	0.00	0.89	24.31	17.22	0.00	0.00	0.00	0.38	261.20	261.20	0.00	0.00	0.00	0.00	0.00	0.00
402975	Sanjapada	1927	374.00	0.00	40.85	1.80	23.92	0.00	0.00	0.00	0.00	307.43	269.85	37.58	37.58	0.00	0.00	0.00	0.00
402976	Badibahal	518	140.00	11.65	0.23	11.33	7.26	0.00	0.00	0.00	0.02	109.51	79.47	30.04	0.00	0.00	30.04	0.00	0.00
402977	Khaliberana	823	200.00	2.52	0.15	18.96	13.68	0.00	0.00	0.00	0.00	164.69	164.69	0.00	0.00	0.00	0.00	0.00	0.00
402978	Nadeilo	529	101.00	0.00	0.71	12.13	1.64	0.00	0.00	0.00	0.38	86.14	86.14	0.00	0.00	0.00	0.00	0.00	0.00
402979	Bramhanapurunakot	627	257.00	0.00	0.24	40.29	14.11	0.00	0.00	0.00	0.00	202.36	202.36	0.00	0.00	0.00	0.00	0.00	0.00
402980	Naraharipur	198	33.00	0.00	0.09	3.29	0.00	0.00	0.00	0.00	0.00	29.62	29.62	0.00	0.00	0.00	0.00	0.00	0.00
402981	Chandrasekharpur	91	34.00	0.00	3.27	0.00	0.08	0.00	0.00	0.00	0.42	30.23	30.23	0.00	0.00	0.00	0.00	0.00	0.00
402982	Kankalu	1210	205.00	0.00	0.48	32.81	9.80	0.00	0.00	0.00	0.00	161.91	161.91	0.00	0.00	0.00	0.00	0.00	0.00
402983	Mitikapasi	125	74.00	4.20	0.61	5.50	5.34	0.00	0.00	0.00	0.00	58.35	58.35	0.00	0.00	0.00	0.00	0.00	0.00
402984	Sarapa	486	176.00	23.71	0.74	14.45	12.00	0.00	0.00	0.00	0.00	125.10	125.10	0.00	0.00	0.00	0.00	0.00	0.00
402985	Raghunathapur	823	232.00	9.68	1.46	45.47	9.74	0.00	0.00	0.00	0.40	165.25	165.25	0.00	0.00	0.00	0.00	0.00	0.00
402986	Nuagan	975	195.00	0.00	0.26	23.51	9.13	0.00	0.00	0.00	0.00	162.10	162.10	0.00	0.00	0.00	0.00	0.00	0.00
402987	Mahatala	71	56.00	0.00	0.38	2.79	3.47	0.00	0.00	0.00	0.00	49.36	49.36	0.00	0.00	0.00	0.00	0.00	0.00
402988	Kaliakoli	8	82.00	5.21	0.73	6.60	6.21	0.00	0.00	0.00	0.00	63.25	63.25	0.00	0.00	0.00	0.00	0.00	0.00
402989	Paikpurunakot	1345	434.00	123.19	1.07	65.87	21.76	0.00	0.00	0.00	0.20	221.91	221.91	0.00	0.00	0.00	0.00	0.00	0.00
402991	Jhaduberani	387	189.00	17.53	0.33	42.98	5.35	0.00	0.00	0.00	0.44	122.37	122.37	0.00	0.00	0.00	0.00	0.00	0.00
402993	Beruanpal	1217	296.00	0.00	10.40	0.00	19.14	0.00	0.00	0.00	23.91	242.55	122.66	119.89	119.89	0.00	0.00	0.00	0.00
402994	Gandijhara	218	79.00	0.00	0.97	0.00	0.99	0.00	0.00	0.00	16.30	60.74	60.74	0.00	0.00	0.00	0.00	0.00	0.00
402995	Galapada	1222	338.00	11.00	7.03	0.00	22.91	0.00	0.00	0.00	37.10	259.96	237.52	22.44	22.44	0.00	0.00	0.00	0.00
402996	Bhanupada	293	69.00	0.00	2.46	0.00	3.50	0.00	0.00	0.00	13.22	49.82	49.82	0.00	0.00	0.00	0.00	0.00	0.00
402997	Chitipada	256	66.00	0.00	3.23	0.00	4.36	0.00	0.00	0.00	10.73	47.68	47.68	0.00	0.00	0.00	0.00	0.00	0.00
402998	Nimabahali	967	206.00	13.89	3.04	0.00	8.82	0.00	0.00	0.00	26.45	153.80	153.80	0.00	0.00	0.00	0.00	0.00	0.00
402999	Kothalu	379	48.00	0.00	3.90	0.00	2.13	0.00	0.00	0.00	4.19	37.78	37.78	0.00	0.00	0.00	0.00	0.00	0.00
403000	Jhadabandha	1635	560.00	104.79	11.64	0.00	30.15	0.00	0.00	0.00	81.46	331.96	331.96	0.00	0.00	0.00	0.00	0.00	0.00
403001	Madhupur	126	190.00	37.31	12.12	11.09	11.35	13.09	3.57	3.61	0.00	97.86	97.86	0.00	0.00	0.00	0.00	0.00	0.00
403002	Nua	2250	576.00	48.68	20.30	10.59	19.05	18.21	1.17	15.27	0.85	441.88	429.66	12.22	12.22	0.00	0.00	0.00	0.00
403003	Thokar	1721	358.00	22.59	18.24	13.20	12.91	8.37	0.65	6.30	2.83	272.91	272.91	0.00	0.00	0.00	0.00	0.00	0.00
403004	Barasingha	2455	647.00	43.23	36.43	20.24	14.89	40.40	5.75	24.29	8.50	453.27	453.27	0.00	0.00	0.00	0.00	0.00	0.00

POPULATION AND LANDUSE OF 10KM STUDY AREA, CENSUS 2011 (Ha)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	Population	Total area	Forest land	Area under Non-Agricultural Uses	Barren & Un-cultivable Land	Permanent Pastures and Other Grazing Land	Land Under Misc. Tree Crops etc.	Culturable Waste Land	Fallows Land other than Current Fallows	Current Fallows	Net Area Sown	Total Unirrigated Land	Area Irrigated by Source	Canals	Wells/ Tube Wells	Tanks/Lakes	Waterfall	Other Source
403005	Tarkabeda	1073	766.00	54.31	43.46	31.05	41.09	53.58	3.00	20.36	29.29	489.86	489.86	0.00	0.00	0.00	0.00	0.00	0.00
403006	Kadala	2129	261.00	7.19	12.14	8.00	5.17	9.00	18.81	2.02	0.00	198.67	198.15	0.52	0.52	0.00	0.00	0.00	0.00
403007	Benipathara	142	67.00	0.00	2.82	0.00	25.40	0.00	0.00	0.00	0.00	38.78	38.78	0.00	0.00	0.00	0.00	0.00	0.00
403008	Badamunda	649	205.00	4.97	0.29	0.00	10.23	0.00	0.00	0.00	0.00	189.51	189.51	0.00	0.00	0.00	0.00	0.00	0.00
403009	Kantimili	1469	280.00	12.97	10.20	15.01	8.29	0.00	0.00	0.02	0.00	233.51	233.51	0.00	0.00	0.00	0.00	0.00	0.00
403010	Sanamunda	831	259.00	19.14	12.00	13.01	12.00	0.00	0.00	0.00	0.00	202.85	202.85	0.00	0.00	0.00	0.00	0.00	0.00
403011	Solanali	428	92.00	0.00	3.75	4.04	6.13	0.00	0.00	0.34	0.00	77.74	77.74	0.00	0.00	0.00	0.00	0.00	0.00
403012	Jharabeda	899	199.00	7.05	13.23	18.09	19.06	0.00	0.00	0.39	0.00	141.18	141.18	0.00	0.00	0.00	0.00	0.00	0.00
403013	Nuapada	685	221.00	15.37	18.70	22.05	7.53	0.00	0.00	0.78	1.72	154.85	154.85	0.00	0.00	0.00	0.00	0.00	0.00
403014	Patala	2003	332.00	17.34	18.03	11.00	1.99	0.00	0.00	0.05	0.00	283.59	283.59	0.00	0.00	0.00	0.00	0.00	0.00
403015	Bankidi	1114	214.00	8.86	13.00	11.62	5.40	0.00	0.00	1.12	0.32	173.68	173.68	0.00	0.00	0.00	0.00	0.00	0.00
403016	Panuberani	316	158.00	6.50	0.46	25.02	6.09	0.00	0.00	0.00	0.43	119.50	119.50	0.00	0.00	0.00	0.00	0.00	0.00
403017	Dahanimara	73	35.00	0.00	1.44	0.00	1.56	0.00	0.00	0.00	0.00	32.00	32.00	0.00	0.00	0.00	0.00	0.00	0.00
403018	Khalapal	332	32.00	0.00	0.19	0.27	1.67	0.00	0.00	0.08	0.00	29.79	29.79	0.00	0.00	0.00	0.00	0.00	0.00
403019	Nagiaberani	179	33.00	0.00	1.45	3.14	0.89	0.00	0.00	0.00	0.00	27.52	27.52	0.00	0.00	0.00	0.00	0.00	0.00
403020	Iswarapur	241	39.00	7.75	0.86	1.41	0.00	0.00	0.18	2.51	0.00	26.29	0.00	26.29	26.29	0.00	0.00	0.00	0.00
403021	Gotiaberani	119	60.00	0.00	3.00	2.01	1.86	0.00	0.00	0.08	0.09	52.96	52.96	0.00	0.00	0.00	0.00	0.00	0.00
403022	Kantamila	449	115.00	13.90	7.09	3.80	7.38	0.00	0.00	0.86	0.00	81.97	81.97	0.00	0.00	0.00	0.00	0.00	0.00
403024	Mahalunda	1494	161.00	0.00	3.62	12.57	1.54	0.00	0.00	0.07	0.00	143.20	143.20	0.00	0.00	0.00	0.00	0.00	0.00
403025	Bedanali	150	38.00	0.00	0.01	0.12	0.11	0.00	0.00	0.13	0.00	37.63	37.63	0.00	0.00	0.00	0.00	0.00	0.00
403026	Maguberani	396	55.00	3.86	4.74	1.83	1.58	0.00	0.00	1.40	0.25	41.34	41.34	0.00	0.00	0.00	0.00	0.00	0.00
403027	Krushnachandrapur	559	90.00	0.00	3.28	4.02	0.22	0.00	0.00	0.00	0.00	82.48	82.48	0.00	0.00	0.00	0.00	0.00	0.00
403029	Dudurokot	5189	1451.00	120.79	100.07	32.90	43.96	85.35	20.89	40.37	28.36	978.31	900.33	77.98	0.00	0.00	77.98	0.00	0.00
403030	Bramhanamara	939	238.00	20.31	22.26	13.76	10.15	6.07	1.87	3.20	0.00	160.38	160.38	0.00	0.00	0.00	0.00	0.00	0.00
403031	Kumurusinga	1276	412.00	40.46	11.19	6.12	20.10	19.51	0.00	4.07	2.07	308.48	294.36	14.12	0.00	0.00	14.12	0.00	0.00
403032	Ranjagola	2817	709.00	55.48	32.38	6.07	27.51	2.83	2.26	40.02	4.45	538.00	488.69	49.31	49.31	0.00	0.00	0.00	0.00
403033	Asarada	1061	268.00	41.46	15.12	8.90	19.90	9.31	0.23	4.58	0.00	168.50	168.50	0.00	0.00	0.00	0.00	0.00	0.00
403034	Balimi	889	206.00	11.42	20.31	1.33	3.13	10.76	0.00	2.02	0.00	157.03	157.03	0.00	0.00	0.00	0.00	0.00	0.00
403036	Sanahindol	749	139.00	16.61	12.81	4.64	4.07	5.07	0.00	3.21	0.00	92.59	92.59	0.00	0.00	0.00	0.00	0.00	0.00
403037	Nandapur	802	185.00	8.02	6.26	4.04	2.08	8.50	0.00	1.09	0.50	154.51	154.51	0.00	0.00	0.00	0.00	0.00	0.00
403043	Tangisal	346	108.00	11.14	3.80	6.74	6.94	0.00	0.00	1.84	0.00	77.54	77.54	0.00	0.00	0.00	0.00	0.00	0.00
	Sub total	**55081**	**14317.00**	**992.06**	**582.03**	**701.90**	**634.40**	**290.05**	**58.38**	**180.08**	**295.80**	**10582.30**	**10191.91**	**390.39**	**268.25**	**0.00**	**122.14**	**0.00**	**0.00**
Tehsil	**Gondia**																		
403099	Karanda	6778	1952.00	18.42	24.46	435.40	71.90	22.40	37.44	0.00	0.00	1341.98	1341.98	0.00	0.00	0.00	0.00	0.00	0.00
	Sub total	**6778**	**1952.00**	**18.42**	**24.46**	**435.40**	**71.90**	**22.40**	**37.44**	**0.00**	**0.00**	**1341.98**	**1341.98**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
District	**Angul**																		
Tehsil	**Talcher**																		
404033	Lingarakata	1278	202.00	0.00	27.52	0.00	0.10	0.00	0.00	9.87	11.66	152.85	152.85	0.00	0.00	0.00	0.00	0.00	0.00
	Sub total	**1278**	**202.00**	**0.00**	**27.52**	**0.00**	**0.10**	**0.00**	**0.00**	**9.87**	**11.66**	**152.85**	**152.85**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

ANNEXURE : X Contd..

POPULATION AND LANDUSE OF 10KM STUDY AREA, CENSUS 2011 (Ha)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	Population	Total area	Forest land	Area under Non-Agricultural Uses	Barren & Un-cultivable Land	Permanent Pastures and Other Grazing Land	Land Under Misc. Tree Crops etc.	Culturable Waste Land	Fallows Land other than Current Fallows	Current Fallows	Net Area Sown	Total Unirrigated Land	Area Irrigated by Source	Canals	Wells/ Tube Wells	Tanks/Lakes	Waterfall	Other Source
Tehsil	**Banarpal**																		
404138	Bagachar	281	82.00	0.00	26.40	1.60	1.20	0.00	0.00	0.40	7.80	44.60	20.60	24.00	15.00	5.00	4.00	0.00	0.00
404139	Pandarbharania	11	15.00	0.00	4.40	0.00	1.20	0.00	0.00	0.00	0.00	9.40	4.60	4.80	2.00	1.00	1.80	0.00	0.00
404140	Majhika	45	20.00	0.00	9.00	0.00	0.00	0.00	0.00	0.00	0.20	10.80	3.80	7.00	4.00	2.00	1.00	0.00	0.00
404141	Tentulihata	768	85.00	0.00	19.80	2.40	9.80	0.00	0.00	0.00	0.40	52.60	28.40	24.20	12.00	5.00	2.20	0.00	5.00
404142	Apartipur	552	55.00	2.40	26.00	0.00	2.00	0.00	0.00	0.00	0.40	24.20	12.20	12.00	3.00	8.00	1.00	0.00	0.00
404143	Bonda	2694	434.00	0.00	53.97	16.13	21.71	7.17	0.00	0.80	11.75	322.47	181.05	141.42	119.52	14.94	6.97	0.00	0.00
404145	Banarpal	1522	60.00	0.00	30.97	0.00	13.35	0.00	0.00	0.00	0.00	15.68	7.94	7.74	2.90	2.90	1.94	0.00	0.00
404146	Joragadia	389	79.00	0.80	20.20	0.00	8.60	0.00	0.00	0.00	0.80	48.60	24.40	24.20	15.00	8.00	1.20	0.00	0.00
404147	Birabahanpur	384	95.00	0.00	26.99	2.13	16.15	0.00	0.00	0.00	5.53	44.20	18.49	25.71	15.94	8.50	1.27	0.00	0.00
404148	Badakhali	362	128.00	1.82	46.13	0.00	4.74	0.73	0.00	0.00	0.73	73.85	29.18	44.67	9.11	27.35	8.21	0.00	0.00
404149	Bhagabatpur	725	162.00	5.20	32.40	0.00	20.40	0.80	0.00	0.80	1.20	101.20	32.40	68.80	20.00	25.00	18.80	0.00	5.00
404150	Narendrapur	405	181.00	0.00	126.00	3.60	6.80	0.00	0.00	0.00	22.40	22.20	10.20	12.00	5.00	5.00	2.00	0.00	0.00
404151	Chauridiha	892	123.00	0.00	40.40	3.60	13.80	0.40	0.00	0.00	0.00	64.80	28.40	36.40	25.00	10.00	1.40	0.00	0.00
404152	Jhajiribahal	994	177.00	0.00	77.67	5.96	28.21	3.18	0.00	0.00	2.38	59.60	27.81	31.79	17.88	8.94	4.97	0.00	0.00
404153	Gadasantri	3877	796.00	0.00	141.33	20.05	32.16	3.18	0.00	1.98	6.76	590.54	269.17	321.37	248.13	49.62	23.62	0.00	0.00
404155	Gangijodi	149	41.00	0.01	11.14	1.26	1.26	0.84	0.00	0.00	0.84	25.65	13.04	12.61	0.00	10.51	2.10	0.00	0.00
404156	Tulasipal	3060	603.00	4.00	170.42	22.99	25.01	18.76	0.00	3.23	4.64	353.95	109.92	244.03	176.47	25.21	42.35	0.00	0.00
404160	Rajibpur	374	41.00	0.00	13.00	4.80	2.00	0.80	0.00	0.00	0.20	20.20	20.20	0.00	0.00	0.00	0.00	0.00	0.00
404163	Purkia	1284	225.00	0.40	58.20	0.00	11.40	1.20	0.00	0.00	0.00	153.80	69.80	84.00	50.00	30.00	4.00	0.00	0.00
404164	Arahat	1513	287.00	0.00	17.34	9.77	36.67	0.80	0.00	1.59	1.60	219.23	57.00	162.23	101.51	48.34	12.38	0.00	0.00
404165	Talatali	1619	420.00	31.27	101.76	37.37	42.74	5.18	0.00	0.00	2.23	199.45	94.54	104.91	74.01	27.75	3.15	0.00	0.00
404167	Kalandapal	303	82.00	0.00	14.60	2.60	1.60	0.00	0.00	0.00	0.20	63.00	22.00	41.00	20.00	10.00	11.00	0.00	0.00
404172	Rankasinga	554	128.00	0.00	17.00	12.00	1.60	3.60	0.00	0.00	12.80	81.00	32.00	49.00	25.00	15.00	9.00	0.00	0.00
404173	Juharpur	379	63.00	0.00	19.80	8.40	0.80	0.90	0.00	0.00	0.40	32.70	13.00	19.70	5.00	10.00	4.40	0.00	0.30
404174	Similichhuin	440	137.00	0.00	14.20	22.60	11.00	0.20	0.00	0.00	0.80	88.20	28.20	60.00	30.00	20.00	10.00	0.00	0.00
404175	Chakuriapal	73	43.00	0.00	15.60	4.00	0.00	0.80	0.00	0.00	0.00	22.60	10.60	12.00	8.00	3.00	1.00	0.00	0.00
404182	Gadatalamul	1813	279.00	0.00	47.00	25.20	6.00	3.90	0.00	0.00	2.40	194.50	68.80	125.70	100.00	20.00	5.40	0.00	0.30
404192	Budhapanka (CT)	6129	1219.00	-	1219.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
404193	Gotamara (CT)	4823	715.65	-	715.65	-	-	-	-	-	-	-	-	-	-	-	-	-	-
404194	Nuahata (CT)	5920	848.00	-	848.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
404195	Talabahal	673	74.00	0.00	25.20	2.40	7.20	0.00	0.00	0.00	0.80	38.40	22.40	16.00	10.00	5.00	1.00	0.00	0.00
404196	Ganthigadia	425	175.00	0.79	94.62	0.00	29.30	1.98	0.00	0.00	4.76	43.55	27.71	15.84	9.90	4.95	0.99	0.00	0.00
	Sub total	**43432**	**7872.65**	**46.69**	**4084.19**	**208.86**	**356.70**	**54.42**	**0.00**	**8.80**	**92.02**	**3020.97**	**1287.85**	**1733.12**	**1124.37**	**411.01**	**187.15**	**0.00**	**10.60**
	GRAND TOTAL	**170881**	**37454.65**	**1529.78**	**7783.12**	**4418.25**	**1409.35**	**540.65**	**257.31**	**1412.54**	**955.47**	**19148.18**	**16462.37**	**2685.81**	**1954.92**	**411.01**	**309.29**	**0.00**	**10.60**
	%		**100.00**	**4.08**	**20.78**	**11.80**	**3.76**	**1.44**	**0.69**	**3.77**	**2.55**	**51.12**	**43.95**	**7.17**	**72.79**	**15.30**	**11.52**	**0.00**	**0.39**

ANNEXURE : X Contd..

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ANNEXURE : XI

TEST REPORT

Customer's Name & Address	
Rungta Mines Ltd. (Ferro Alloys Division) Vill.- Tulasidiha, P.O.- Meramandali Dist.- Dhenkanal, Odisha- 759121 Contact Person: Mr. G. P. Sharma, Phone: 06582-256861	
Customer Particulars	
Type of Sample	: Soil
Work Order No.	: 4800028086
Sampling Location	: In and around Expansion of Ferro Alloy Plant, Odisha
Sampling Procedure	: Section 3.0, of FWIM, dated 15.12.2020
Sample Volume/ Quantity	: 2.2 Kg
Sampling Team	: MMRDL (Gaurav)
Sample Reg. No.	: MMS/05-22/5.1-5.4
Date(s) of Sampling	: 24/05/2022
Date(s) of Receipt	: 26/05/2022
Date(s) of Testing	: 26/05/2022 to 31/05/2022
Date of Report	: 31/05/2022
Test Report No.	: MMS/05-22/64
ULR No.	: TC633722000000072F
Page	: 1 of 1

Parameters	Protocol	Existing Plant near Admin Building	Core zone Expansion area (Centre)	Chararhagarhia Village	Core zone Expansion area (North Side)
pH	IS 2720 (P26): 1987, RA 2016	6.7	7.4	7.9	7.4
E.C. (mS/cm)	IS 14767:2000, RA 2021	0.1232	0.1153	0.4960	0.1118
$CaCO_3$ (%by mass)	IS 2720 (P23): 1976, RA 2020	4.5	4.5	11.0	4.0
Specific Gravity	IS : 2720 (P 3/Sec 2):1980, RA 2016	2.35	2.30	2.51	2.20
Moisture (%by mass)	IS 2720 (P 2): 1973, RA 2020	7.289	7.585	5.706	12.813
Sodium (Kg/ha)	Lab SOP/12/7: 2017	203.84	284.48	445.76	212.80
Potassium (Kg/ha)	Lab SOP/12/7: 2017	125.0	128.0	63.0	206.0

FWIM: Field Work Instruction Manual

Prepared by
Rashmi Gupta
Administrative Manager

Checked by
Dr. Marisha Sharma
Authorised Signatory

-end of report-

NOTES:

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ANNEXURE : XI Contd..

TEST REPORT

Customer's Name & Address
Rungta Mines Ltd. (Ferro Alloys Division) Vill.- Tulasidiha, P.O.- Meramandali Dist.- Dhenkanal, Odisha- 759121 Contact Person: Mr. G. P. Sharma, Phone: 06582-256861

Customer Particulars	
Type of Sample	: Soil
Work Order No.	: 4800028086
Sampling Location	: In and around Expansion of Ferro Alloy Plant, Odisha
Sampling Procedure	: Section 3.0, of FWIM, dated 15.12.2020
Sample Volume/ Quantity	: 2.2 Kg
Sampling Team	: MMRDL (Gaurav)
Sample Reg. No.	: MMS/05-22/5.1-5.4
Date(s) of Sampling	: 24/05/2022
Date(s) of Receipt	: 26/05/2022
Date(s) of Testing	: 26/05/2022 to 31/05/2022
Date of Report	: 31/05/2022
Test Report No.	: MMS/05-22/65
Page	: 1 of 1

Parameters	**Protocol**	**Existing Plant near Admin Building**		**Core zone Expansion area (Centre)**		**Chararhagarhia Village**		**Core zone Expansion area (North Side)**	
Textural Classification	IS 1498:1970, RA 2007	Medium grained sand		Medium grained sand		Medium grained sand		Medium grained sand	
Grain size analysis	IS 2720 (P 4): 1985, RA 2020	% retain	% finer	% retain	% finer	% retain	% finer	% retain	% finer
2.0 mm		10.79	89.21	6.37	93.63	5.17	94.83	12.33	87.67
425 µm		53.4	35.81	50.31	43.32	49.88	44.95	58.36	29.31
75 µm		29.48	6.33	35.75	7.57	36.92	8.03	24.13	5.18
<75 µm		6.33	-	7.57	-	8.03	-	5.18	-
Colour	-	Medium Brown		Dark Brown		Dark Brown		Dark Brown	
Organic Carbon (% by mass)	Method no. 9*	0.48		0.65		0.48		0.75	
Organic Matter (% by mass)	Method no. 9*	0.83		1.11		0.83		1.30	
Phosphorous (mg/kg)	Method no. 13*	8.75		6.81		7.29		7.62	
Nitrate-Nitrogen (mg/kg)	Method no. 12*	2.55		2.14		1.66		0.53	
Calcium^{2+} me/100 gram Soil	Method no. 16.a*	18.7		15.7		16.2		21.1	
Magnesium^{2+} me/100 gram Soil	Method no. 16.b*	4.8		4.4		8.2		4.9	

Note: – ****Methods Manual, Soil Testing in India, Department of Agriculture & Cooperation, Ministry of Agriculture (MOA), Government of India 2011.***
FWIM: Field Work Instruction Manual

Prepared by



Rashmi Gupta
Administrative Manager

Checked by



Dr. Marisha Sharma
Authorised Signatory
-end of report-

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TEST REPORT

ANNEXURE : XI Contd..

Customer's Name & Address

Rungta Mines Ltd. (Ferro Alloys Division)
Vill.- Tulasidiha, P.O.- Meramandali
Dist.- Dhenkanal, Odisha- 759121

Contact Person: Mr. G. P. Sharma, Phone: 06582-256861

Customer Particulars	
Type of Sample	: Soil
Work Order No.	: 4800028086
Sampling Location	: In and around Expansion of Ferro Alloy Plant, Odisha
Sampling Procedure	: Section 3.0, Primary data collection of FWIM, Issue 3, Rev 00, Dated 15.12.2020
Sample Volume/ Quantity	: 1.2 Kg
Sampling Team	: MMRDL (Gaurav)
Sample Reg. No.	: MMS/04-23/1.1-1.4
Date(s) of Sampling	: 23/04/2023
Date(s) of Receipt	: 25/04/2023
Date(s) of Testing	: 25/04/2023 to 28/04/2023
Date of Report	: 28/04/2023
Test Report No.	: MMS/04-23/19
Page	: 1 of 1

Parameters	Protocol	Existing Plant near Admin Building	Core zone Expansion area (Centre)	Chararhagarhia Village	Core zone Expansion area (North Side)
Cation exchange capacity, meq/100gram soil	Method no. 3*	1.33	1.31	1.42	1.35
Water Holding Capacity, %	IS 14765 : 2000	28.21	31.18	27.83	25.31
SAR, (meq/l)	By Calculation**	1.24	2.19	2.24	1.35
Porosity, %	SMF#	44	40	46	48
Permeability, cm/sec.	IS 2720 (P 17): 1986, RA 2021	$2.4x10^{-3}$	$2.6x10^{-3}$	$2.5x10^{-3}$	$2.3x10^{-3}$

Note: – ****Methods Manual, Soil Testing in India, Department of Agriculture & Cooperation, Ministry of Agriculture (MOA), Government of India 2011***
#Section 2.4, Soil Mechanics and foundations by B. C. Punmia
*****Concentration in a Saturated Soil Paste***
Abbreviation: FWIM- Field Work Instruction Manual

Prepared by

Rashmi Gupta
Administrative Manager

Checked by

Dr. Marisha Sharma
Authorised Signatory
-end of report-

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ANNEXURE : XII

LIST OF FLORA IN THE CORE ZONE AND BUFFER ZONE FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA

CORE ZONE

Sl. No	Scientific Name	Local Name	Family
	TREES		
1	*Acacia lenticularis*	Garh khair	Fabaceae
2	*Acacia nilotica*	Babul	Fabaceae
3	*Anacardium occidentale*	Kaju	Anacardiaceae
4	*Azadirachta indica*	Neem	Meliaceae
5	*Borassus flabelliformis*	Tal	Arecaceae
6	*Butea monosperma*	Palas	Fabaceae
7	*Mangifera indica*	Amba	Anacardiaceae
8	*Moringa oleifera*	Sajana	Moringaceae
9	*Phoenix sylvestris*	Khajur	Arecaceae
10	*Psidium guajava*	Pijuli	Myrtaceae
11	*Spondis pinnata*	Ambada	Anacardiaceae
12	*Syzygium cumini*	Jamu	Myrtaceae
13	*Zizyphus mauritiana*	Barakoli	Rhamnaceae
	SHRUBS		
1	*Calotropis gigantea*	Arakha	Apocynaceae
2	*Ipomoea purpurea*	Kalanjani	Convolvulaceae
3	*Jatropha podagrica*	Baigaba	Euphorbiaceae
4	*Lantana camara*	Nagairi	Verbenaceae
5	*Phoenix acaulis*	Bankhajuri	Arecaceae
6	*Ricinus communis*	Lankajada	Euphorbiaceae
7	*Vitex negundo*	Begunia	Lamiaceae
	HERBS		
1	*Amaranthus spinosus*	Chaulii	Amaranthaceae
2	*Mimosa pudica*	Lajwanti	Fabaceae
3	*Ocimum sanctum*	Tulsi	Lamiaceae
	GRASSES		
1	*Cynodon dactylon*	Duba	Poaceae
2	*Dichanthium annulatum*	Marvel grass	Poaceae
3	*Heteropogon contortus*	Sinkula	Poaceae
4	*Themeda triandra*	Rooi grass	Poaceae
	CLIMBERS		
1	*Abrus precatorius*	Kaincha	Fabaceae
2	*Entada scandens*	Gila	Fabaceae
3	*Mucuna pruriens*	Baidanka	Fabaceae
4	*Tinospora cordifolia*	Guluchi	Menispermaceae
5	*Ziziphus oenoplia*	Makai	Rhamnaceae

ANNEXURE : XII Contd..

BUFFER ZONE

Sl. No.	Scientific Name	Local Name	Family
	TREES		
1	*Acacia auriculiformis*	Acacia	Fabaceae
2	*Acacia lenticularis*	Garh khair	Fabaceae
3	*Acacia nilotica*	Babul	Fabaceae
4	*Aegle marmelos*	Bel	Rutaceae
5	*Ailanthus excelsa*	Mahal	Simaroubaceae
6	*Albizia lebbeck*	Siris(Black)	Fabaceae
7	*Albizia procera*	Sirisa(White)	Fabaceae
8	*Alstonia scholaris*	Chhaitian	Apocynaceae
9	*Anacardium occidentale*	Kaju	Anacardiaceae
10	*Anthocephalus chinensis*	Kadamba	Rubiaceae
11	*Artocarpus heterophyllus*	Panasa	Moraceae
12	*Azadirachta indica*	Neem	Meliaceae
13	*Bombax ceiba*	Simili	Malvaceae
14	*Borassus flabellifer*	Tal	Arecaceae
15	*Buchanania lanzan*	Char	Anacardiaceae
16	*Butea monosperma*	Palas	Fabaceae
17	*Caesalpinia pulcherrima*	Bishnu chuda	Fabaceae
18	*Cassia fistula*	Sunari	Fabaceae
19	*Cocos nucifera*	Nadia	Arecaceae
20	*Dalbergia sissoo*	Sisu	Fabaceae
21	*Delonix regia*	Krushna chuda	Fabaceae
22	*Diospyros melanoxylon*	Kendu	Ebenaceae
23	*Eucalyptus globulus*	Patas	Myrtaceae
24	*Ficus benghalensis*	Bara	Moraceae
25	*Ficus glomerata*	Dimiri	Moraceae
26	*Ficus religiosa*	Aswastha	Moraceae
27	*Limonia acidissima*	Kaitha	Rutaceae
28	*Madhuca indica*	Mahul	Sapotaceae
29	*Mangifera indica*	Amba	Anacardiaceae
30	*Melia composita*	Batra	Meliaceae
31	*Mimusops elengi*	Baula	Sapotaceae
32	*Moringa oleifera*	Sajana	Moringaceae
33	*Phoenix sylvestris*	Khajur	Arecaceae
34	*Polyalthia cerasiodes*	Patmossu	Annonaceae
35	*Pongamia pinnata*	Karanj	Fabaceae

ANNEXURE : XII Contd..

Sl. No.	Scientific Name	Local Name	Family
36	*Psidium guajava*	Pijuli	Myrtaceae
37	*Spondis pinnata*	Ambada	Anacardiaceae
38	*Syzygium cumini*	Jamu	Myrtaceae
39	*Tamarindus indica*	Tentuli	Fabaceae
40	*Tectona grandis*	Teak	Lamiaceae
41	*Zizyphus mauritiana*	Barakoli	Rhamnaceae
	BAMBOO		
1	*Bambusa aurea*	Kanta bans	Poaceae
2	*Dendrocalamus strictus*	Salia	Poaceae
	SHRUBS		
1	*Calotropis gigantia*	Arakha	Apocynaceae
2	*Cassia alata*	Candle-stick tree	Fabaceae
3	*Clerodendron viscosum*	Kumuti	Lamiaceae
4	*Datura metel*	Durdura	Solanaceae
5	*Euphorbia neriifolia*	Nagafeni	Euphorbiaceae
6	*Hibiscus rosa-sinensis*	Mandar	Malvaceae
7	*Ipomoea purpurea*	Kalanjani	Convolvulaceae
8	*Jatropha podagrica*	Baigaba	Euphorbiaceae
9	*Justicia adhatoda*	Basang	Acanthaceae
10	*Lantana camara*	Nagairi	Verbenaceae
11	*Phoenix acaulis*	Bankhajuri	Arecaceae
12	*Ricinus communis*	Lankajada	Euphorbiaceae
13	*Vitex negundo*	Begunia	Lamiaceae
14	*Woodfordia fruticosa*	Dhatki	Lythraceae
15	*Wrightia antidysenterica*	Korei	Apocynaceae
	HERBS		
1	*Achyranthus aspera*	Chirchira	Amaranthaceae
2	*Amaranthus spinosus*	Chaulii	Amaranthaceae
3	*Euphorbia hirta*	Dudhi bel	Euphorbiaceae
4	*Leucas montana*	Gopha	Lamiaceae
5	*Mimosa pudica*	Lajwanti	Fabaceae
6	*Ocimum gratissimum*	Banatulsi	Lamiaceae
7	*Ocimum sanctum*	Tulsi	Lamiaceae
8	*Solanum nigrum*	Bheji baigana	Solanaceae
	CLIMBERS		
1	*Abrus precatorius*	Kaincha	Fabaceae
2	*Butea superba*	Palaslata	Fabaceae

ANNEXURE : XII Contd..

Sl. No.	Scientific Name	Local Name	Family
3	*Capparis zeylanica*	Asadua	Capparaceae
4	*Combretum decandrum*	Atundi	Combretaceae
5	*Entada scandens*	Gila	Fabaceae
6	*Hemidesmus indicus*	Anantamula	Apocynaceae
7	*Mucuna pruriens*	Baidanka	Fabaceae
8	*Phanera Vahlii*	Siali	Fabaceae
9	*Smilax macrophylla*	Muturi	Smilacaceae
10	*Tinospora cordifolia*	Guluchi	Menispermaceae
11	*Ziziphus oenoplia*	Makai	Rhamnaceae
	GRASSES		
1	*Cynodon dactylon*	Duba	Poaceae
2	*Dichanthium annulatum*	Marvel grass	Poaceae
3	*Heteropogon contortus*	Sinkula	Poaceae
4	*Themeda triandra*	Rooi grass	Poaceae

ANNEXURE : XIII

LIST OF FAUNA IN THE CORE ZONE AND BUFFER ZONE FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA

CORE ZONE

Sl. No.	Scientific Name	Local Name	English Name	Schedule as per WPA 1972, Amendment 2022
MAMMALS				
1	*Canis aureus*	Bilua	Jackal	I, Part A (22)
2	*Cynopterus sphinx*	Badudi	Short-nosed fruit bat	Not Listed (IUCN-LC)
3	*Funambulus pennantii*	Gunduchimusa	Five stripped palm squirrel	Not Listed (IUCN-LC)
4	*Lepus nigricollis*	Thekua	Indian hare	II, Part A (13)
5	*Macaca mulatta*	Pati Mankada	Rhesus macaque	Not Listed (IUCN-LC)
6	*Rattus rattus*	Musa	Common house rat	Not Listed (IUCN-LC)
7	*Semnopithecus entellus*	Hanu Mankada	Northern plains gray/hanuman langur	II, Part A (24)
8	*Sus scrofa*	Barha	Indian wild pig	II, Part A (23)
9	*Urva edwardsii*	Neula	Grey mongoose	I, Part A (97)
REPTILES				
1	*Bungarus caeruleus*	Chiti	Common Indian krait	Not Listed (IUCN-LC)
2	*Calotes versicolor*	Jhitipiti	Common garden lizard	Not Listed (IUCN-LC)
3	*Chamaeleon zeylanicus*	Pohalaendua	Indian chameleon	I, Part C (6)
4	*Echis carinatus*	Boda Sapa	Saw scaled viper	II, Part C (22)
5	*Hemidactylus flaviviridis*	Jhitipiti	Indian house gecko	Not Listed (IUCN-LC)
6	*Hemidactylus maculatus*	Endua	Giant spotted gecko	Not Listed (IUCN-LC)
7	*Mabuya bibronii (Eutropis bibiyonni)*	Champainoil	Skink	Not Listed (IUCN-LC)
8	*Ptyas mucosa*	Dhaman	Indian rat snake	I, Part C (26)
AMPHIBIANS				
1	*Duttaphrynus melanostictus*	Luni Benga	Common Asian Toad	Not Listed (IUCN-LC)
2	*Hoplobatrachus tigerinus*	Brahamani Benga	Indian Bull frog	Not Listed (IUCN-LC)

ANNEXURE : XIII Contd..

Sl. No.	Scientific Name	Local Name	English Name	Schedule as per WPA 1972, Amendment 2022
BIRDS				
1	*Acridotheres tristris*	Bani	Common myna	II, Part B (955)
2	*Ardeola grayili*	Kantiabaga	Indian pond heron	II, Part B (36)
3	*Babulcus ibis*	Baga	Cattle egret	II, Part B (29)
4	*Bubo Bubo*	Pecha	Eurresian eagle-owl	I, Part B (141)
5	*Columba livia*	Para	Blue rock pigeon	Not Listed (IUCN-LC)
6	*Coracias bengalensis*	Bhadabhadalia	Indian roller	II, Part B (829)
7	*Corvus macrorhynchos*	Damara kau	Large billed crow	II, Part B (181)
8	*Corvus splendens*	Kau	House crow	Not Listed (IUCN-LC)
9	*Cuculus micropterus*	Koili	Indian cuckoo	II, Part B (206)
10	*Dicrurus macrocerus*	Kajalpati	Black drongo	II, Part B (223)
11	*Francolinus pondicerianus*	Teetiri	Grey francolin	II, Part B (701)
12	*Gallus gallus*	Bana kukuda	Red Jungle fowl	II, Part B (711)
13	*Oriolus xanthornus*	Haladibasanta	Black-hooded oriole	II, Part B (643)
14	*Ploceus phillipinus*	Baya	Baya weaver	II, Part B (1084)
15	*Psittacula eupatria*	Baunsapatria Sua	Alexandrine parakeet	II, Part B (686)
16	*Pycnonotus cafer*	Gobarachadhei	Bulbul (red vented)	II, Part B (63)

Abbreviation: IUCN: International Union for Conservation of Nature
LC: Least Concern

ANNEXURE : XIII Contd..

BUFFER ZONE

Sl. No.	Scientific Name	Local Name	English Name	Schedule as per WPA 1972, Amendment, 2022
MAMMALS				
1	*Canis aureus*	Bilua	Jackal	I, Part A (22)
2	*Cynopterus sphinx*	Badudi	Short-nosed fruit bat	Not Listed (IUCN-LC)
3	*Elephas maximas*	Hati	Indian Elephant	I, Part A (83)
4	*Funambulus pennantii*	Gunduchimusa	Five stripped palm squirrel	Not Listed (IUCN-LC)
5	*Lepus nigricollis*	Thekua	Indian hare	II, Part A (13)
6	*Macaca mulatta*	Pati Mankada	Rhesus macaque	Not Listed (IUCN-LC)
7	*Melursus ursinus*	Bhalu	Sloth Bear	I, Part A (18)
8	*Rattus rattus*	Musa	Common house rat	Not Listed (IUCN-LC)
9	*Semnopithecus entellus*	Hanu Mankada	orthern plains gray/hanuman langur	II, Part A (24)
10	*Sus scrofa*	Barha	Indian wild pig	II, Part A (23)
11	*Urva edwardsii*	Neula	Grey mongoose	I, Part A (97)
REPTILES				
1	*Bungarus caeruleus*	Chiti	Common Indian krait	Not Listed (IUCN-LC)
2	*Calotes versicolor*	Jhitipiti	Common garden lizard	Not Listed (IUCN-LC)
3	*Chamaeleon zeylanicus*	Pohalaendua	Indian chameleon	I, Part C (6)
4	*Echis carinatus*	Boda Sapa	Saw scaled viper	II, Part C (22)
5	*Fowlea piscator (Xenochrophis piscator)*	Panidhanda	Checkered keel back	I, Part C (25)
6	*Hemidactylus flaviviridis*	Jhitipiti	Indian house gecko	Not Listed (IUCN-LC)
7	*Hemidactylus maculatus*	Endua	Giant spotted gecko	Not Listed (IUCN-LC)
8	*Mabuya bibronii (Eutropis bibiyonni)*	Champainoil	Skink	Not Listed (IUCN-LC)
9	*Naja naja*	Naga	Indian cobra	I, Part C (18)
10	*Ptyas mucosa*	Dhaman	Indian rat snake	I, Part C (26)
11	*Python molurus*	Ajagara	Python	I, Part C (31)

ANNEXURE : XIII Contd..

Sl. No.	Scientific Name	Local Name	English Name	Schedule as per WPA 1972, Amendment, 2022
AMPHIBIANS				
1	*Duttaphrynus melanostictus*	Luni Benga	Common Asian Toad	Not Listed (IUCN-LC)
2	*Hoplobatrachus tigerina*	Brahamani Benga	Indian Bull frog	Not Listed (IUCN-LC)
BIRDS				
1	*Acridotheres tristis*	Bani	Common myna	II, Part B (955)
2	*Ardeola grayili*	Kantiabaga	Pond heron	II, Part B (36)
3	*Bubo bubo*	Pecha	Eurasian eagle-owl	I, Part B (141)
4	*Bubulcus ibis*	Baga	Cattle egret	II, Part B (29)
5	*Columba livia*	Para	Blue rock pigeon	Not Listed (IUCN-LC)
6	*Coracias bengalensis*	Bhadabhadalia	Indian roller	II, Part B (829)
7	*Corvus macrorhynchos*	Damara kau	Large billed crow	II, Part B (181)
8	*Corvus splendens*	Kau	House crow	Not Listed (IUCN-LC)
9	*Cuculus micropterus*	Koili	Indian cuckoo	II, Part B (206)
10	*Dicrurus adsimilis*	Damara Kua	Fork-tailed drongo	Not Listed (IUCN-LC)
11	*Dicrurus macrocerus*	Kajalpati	Black drongo	II, Part B (223)
12	*Francolinus pondicerianus*	Teetiri	Grey francolin	II, Part B (701)
13	*Gallus gallus*	Bana kukuda	Red Jungle fowl	II, Part B (711)
14	*Oriolus xanthornus*	Haladibasanta	Black -hooded oriole	II, Part B (643)
15	*Ploceus phillipinus*	Baya	Baya weaver	II, Part B (1084)
16	*Psittacula eupatria*	Baunsapatria Sua	Alexandrine parakeet	II, Part B (686)
17	*Pycnonotus cafer*	Gobarachadhei	Bulbul (red vented)	II, Part B (63)
18	*Pycnonotus jocosus*	Pahadi bulbul	Red whiskered bulbul	II, Part B (64)
19	*Sturnus pagodarum*	Bani	Brahminy starling	II, Part B (951)

Abbreviation: IUCN: International Union for Conservation of Nature
LC: Least Concern

ANNEXURE : XIII Contd..

TAXONOMIC LIST, RELATIVE ABUNDANCE, LIFE HISTORY STRATEGY AND CONSERVATION STATUS OF FISH SPECIES OF RIVER BRAHMAMI

Sl. No.	Scientific Name	Family Name	Life History Strategy	Conservation Status	Near Kamalanga Village	Relative abundance
1	*Aspidoparia morar*	Cyprinidae	Periodic	Least Concern	12	6.06
2	*Barilius barila*	Cyprinidae	Periodic	Least Concern	4	2.02
3	*Chanda nama*	Ambassidae	Opportunistic	Least Concern	14	7.07
4	*Cirrihinus mrigala*	Cyprinidae	Periodic	Least Concern	2	1.01
5	*Cirrihinus reba*	Cyprinidae	Periodic	Least Concern	2	1.01
6	*Clupisoma garua*	Siluridae	Periodic	Least Concern	1	0.51
7	*Crossocheilus latius*	Cyprinidae	Periodic	Not Evaluated	2	1.01
8	*Glossogobius giuris*	Gobiidae	Periodic	Not Evaluated	10	5.05
9	*Gudusia chapra*	Clupeidae	Periodic	Least Concern	6	3.03
10	*Macrognathus pancalus*	Mastacembelidae	Periodic	Least Concern	9	4.55
11	*Mastacembelus armatus* Tetraodontidae	Mastacembelidae	Periodic	Least Concern	6	3.03
12	*Mystus cavasius*	Bagridae	Periodic	Least Concern	2	1.01
13	*Notopterus notopterus*	Notopteridae	Equilibrium	Least Concern	6	3.03
14	*Osteobrama cotio*	Cyprinidae	Periodic	Least Concern	2	1.01
15	*Puntius conchonius*	Cyprinidae	Periodic, Equilibrium	Not Evaluated	3	1.52
16	*Puntius sophore*	Cyprinidae	Periodic	Least Concern	16	8.08
17	*Puntius ticto*	Cyprinidae	Opportunistic	Least Concern	39	19.70
18	*Salmostoma bacaila*	Cyprinidae	Periodic	Least Concern	57	28.79
19	*Securicula gora*	Cyprinidae	Periodic	Least Concern	2	1.01
20	*Wallago attu*	Siluridae	Periodic	Near Threatened	1	0.51
21	*Xenentodon cancila*	Bagridae	Periodic	Least Concern	2	1.01

Source: Research paper Fish diversity, community structure and ecological integrity of River Brahamani by ICAR-Central Inland Fisheries Research Institute, Barrackpore, Kolkata

ANNEXURE : XIII Contd..

COMMON FISH SPECIES IN LINGRA RIVER

Sl. No	Scientific Name	Common Name	Local Name
1	*Anabas testudineus*	Climbing Fish	Kau Fish
2	*Cirrhinus cirrhosus*	Mrigal Fish	Mirikali Fish
3	*Garra gotyla*	Anchovy Fish	Dandei Fish
4	*Heteropneustes fossilis*	Stinging catfish	Singhi Fish
5	*Labeo catla*	Carp Fish	Bhakura Fish
6	*Labeo rohita*	Rohi Fish	Rohi Fish
7	*Mystus gulio*	Dwarf catfish	Kantia Fish
8	*Penaeus indicus*	Shrimp	Chingudi
9	*Puntinus sp*	Minnow Fish	Kerandi Fish
10	*Silurus glanis*	Sheat Fish	Magur Fish

Source: Primary survey in consultation with local fishermen

VILLAGE WISE POPULATION AND LITERACY WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	No. of house-holds	Population break-up			Population (0-6 years)			Schedule Caste	Schedule Tribe	Literacy level		
			Total	Male	Female	Total	Male	Female			Total literates	Male literates	Female literates
District	**Dhenkanal**												
Tehsil	**Parjang**												
402286	Palasahi	333	1283	594	689	154	80	74	88	0	830	444	386
402287	Dihakamar	78	286	160	126	18	9	9	61	0	220	136	84
402288	Patarapada	770	3069	1520	1549	243	132	111	223	0	2300	1225	1075
402289	Sankamar	177	657	343	314	77	50	27	130	0	494	258	236
402290	Gailo	231	854	443	411	103	56	47	318	0	601	339	262
402291	Kundandeipur	154	598	311	287	57	35	22	110	0	432	238	194
402292	Panibhandar	257	1129	603	526	123	58	65	204	0	943	533	410
402293	Badakamar	139	521	273	248	57	32	25	100	0	394	227	167
402294	Katabahal	633	2372	1209	1163	268	140	128	291	0	1613	905	708
402305	Roda	564	2190	1171	1019	208	119	89	507	16	1510	878	632
402308	Siarimalia	158	588	276	312	56	33	23	58	2	362	183	179
	Sub total	**3494**	**13547**	**6903**	**6644**	**1364**	**744**	**620**	**2090**	**18**	**9699**	**5366**	**4333**
Tehsil	**Odapada**												
402897	Kusupanga	450	1911	1013	898	220	134	86	434	0	1323	755	568
402898	Kurunti	673	2910	1737	1173	312	173	139	309	140	2012	1290	722
402899	Kochilamada	314	1114	617	497	130	73	57	189	10	867	512	355
402901	Charadagadia	195	835	430	405	107	55	52	272	39	559	326	233
402902	Tulasidihi	3	16	16	0	1	1	0	0	9	14	14	0
402904	Ghantalapasi	6	20	18	2	0	0	0	0	1	20	18	2
402905	Motunga	446	1883	998	885	201	117	84	356	21	1283	733	550
402906	Kharagprasad	966	4507	2375	2132	581	324	257	2020	108	3412	1919	1493
402907	Kharagprasadpatna	355	1696	882	814	222	105	117	154	22	1257	744	513
402908	Suravi	170	765	416	349	83	43	40	259	12	551	334	217
402909	Bido	319	1407	661	746	157	74	83	411	0	930	482	448
402910	Taladanga	112	438	201	237	57	30	27	92	0	282	144	138
402911	Ranjasinga	298	1256	669	587	126	76	50	102	5	962	553	409
402912	Rangathali	9	52	34	18	4	4	0	16	3	43	30	13
402913	Nagari	246	940	459	481	111	56	55	403	0	634	349	285
402914	Gaudapasi	34	124	62	62	18	9	9	111	0	74	45	29
402915	Chintapokhari	170	775	391	384	96	47	49	68	0	578	317	261
402916	Malibido	170	674	338	336	84	45	39	183	0	467	251	216
402917	Binakarkateni	124	587	292	295	68	34	34	6	0	408	220	188
402918	Budhapanka	175	669	358	311	80	40	40	184	0	558	310	248
402919	Brajabiharipur	65	230	124	106	25	17	8	67	0	170	96	74

VILLAGE WISE POPULATION AND LITERACY WITHIN 10KM STUDY AREA (CENSUS 2011)
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Town/ village code	Town/village name	No. of house-holds	Population break-up			Population (0-6 years)			Schedule Caste	Schedule Tribe	Literacy level		
			Total	Male	Female	Total	Male	Female			Total literates	Male literates	Female literates
402920	Salapada	15	63	33	30	7	4	3	8	0	53	28	25
402922	Kunjabiharipur	117	531	269	262	78	34	44	154	371	356	207	149
402930	Uparbaghalunda	258	955	485	470	117	66	51	381	11	625	353	272
402931	Nayabhagirathipur(East	311	1254	636	618	103	55	48	208	79	1014	537	477
402932	Nayabhagirathipur(Wes	282	1027	535	492	141	71	70	380	93	704	420	284
402933	Kalusahukateni	167	753	390	363	77	47	30	210	0	659	338	321
402934	Haladibahali	407	1662	867	795	186	99	87	448	0	1319	735	584
402935	Budhipahad	117	492	257	235	79	43	36	140	209	267	163	104
402936	Uperpal	104	420	208	212	50	26	24	23	91	292	163	129
402937	Meramandali	351	1377	701	676	136	71	65	487	0	955	553	402
402938	Nimidha	706	3118	1603	1515	414	215	199	684	823	1935	1120	815
402939	Ranibania	161	672	328	344	81	37	44	167	17	455	242	213
402940	Badalo	330	1355	698	657	145	77	68	403	124	925	540	385
402964	Kamalanga	1025	4520	2570	1950	558	304	254	1110	540	3325	2071	1254
402967	Mangalpur	1209	5448	3188	2260	585	302	283	1210	241	4045	2571	1474
402968	Itapa	75	335	179	156	41	25	16	0	2	239	132	107
402969	Narendrapur	509	1940	1078	862	246	114	132	297	810	1242	802	440
402970	Asanabania	47	221	118	103	35	22	13	46	0	148	80	68
402971	Sibapur	383	1813	1015	798	250	135	115	561	707	1452	839	613
	Sub total	**11874**	**50765**	**27249**	**23516**	**6012**	**3204**	**2808**	**12553**	**4488**	**36414**	**21336**	**15078**
Tehsil	**Hindol**												
402972	Rakala	138	636	326	310	81	45	36	128	0	467	272	195
402973	Panaghudughuda	84	344	155	189	38	21	17	171	0	206	102	104
402974	Amana	329	1421	716	705	179	89	90	100	102	921	520	401
402975	Sanjapada	421	1927	992	935	217	111	106	474	19	1262	743	519
402976	Badibahal	128	518	255	263	73	36	37	10	128	359	207	152
402977	Khaliberana	216	823	428	395	86	45	41	43	42	629	353	276
402978	Nadeilo	131	529	276	253	55	32	23	78	173	398	221	177
402979	Bramhanapurunakot	142	627	317	310	89	41	48	182	76	429	246	183
402980	Naraharipur	48	198	100	98	15	5	10	24	22	156	82	74
402981	Chandrasekharpur	24	91	47	44	9	4	5	0	0	70	41	29
402982	Kankalu	277	1210	622	588	146	82	64	452	0	925	508	417
402983	Mitikapasi	32	125	80	45	11	7	4	0	0	92	65	27
402984	Sarapa	118	486	255	231	67	37	30	218	34	354	207	147
402985	Raghunathapur	231	823	443	380	108	55	53	271	74	564	345	219
402986	Nuagan	221	975	505	470	121	62	59	167	128	679	396	283
402987	Mahatala	18	71	40	31	8	5	3	18	0	51	30	21

VILLAGE WISE POPULATION AND LITERACY WITHIN 10KM STUDY AREA (CENSUS 2011)
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Town/ village code	Town/village name	No. of house-holds	Population break-up			Population (0-6 years)			Schedule Caste	Schedule Tribe	Literacy level		
			Total	Male	Female	Total	Male	Female			Total literates	Male literates	Female literates
402988	Kaliakoli	3	8	5	3	0	0	0	8	0	4	2	2
402989	Paikpurunakot	307	1345	689	656	152	84	68	339	21	916	527	389
402991	Jhaduberani	97	387	201	186	44	22	22	70	0	250	158	92
402993	Beruanpal	325	1217	616	601	158	80	78	513	76	799	457	342
402994	Gandijhara	55	218	114	104	28	19	9	218	0	156	88	68
402995	Galapada	320	1222	622	600	138	61	77	621	0	735	437	298
402996	Bhanupada	76	293	154	139	23	10	13	0	0	238	136	102
402997	Chitipada	72	256	153	103	30	19	11	0	0	185	119	66
402998	Nimabahali	239	967	496	471	79	41	38	167	40	743	424	319
402999	Kothalu	110	379	196	183	46	23	23	100	0	291	169	122
403000	Jhadabandha	410	1635	811	824	187	106	81	324	0	1208	654	554
403001	Madhupur	34	126	61	65	15	10	5	0	11	85	43	42
403002	Nua	539	2250	1142	1108	259	162	97	246	36	1508	832	676
403003	Thokar	431	1721	865	856	184	112	72	110	13	1168	636	532
403004	Barasingha	642	2455	1254	1201	270	131	139	988	0	1532	912	620
403005	Tarkabeda	328	1073	578	495	116	76	40	197	37	778	470	308
403006	Kadala	480	2129	1094	1035	223	116	107	535	0	1368	804	564
403007	Benipathara	38	142	80	62	14	7	7	67	0	106	64	42
403008	Badamunda	132	649	325	324	87	38	49	227	0	446	261	185
403009	Kantimili	333	1469	744	725	164	76	88	208	0	915	537	378
403010	Sanamunda	203	831	421	410	95	47	48	327	0	511	305	206
403011	Solanali	111	428	206	222	64	31	33	25	0	232	125	107
403012	Jharabeda	201	899	467	432	111	61	50	270	57	579	333	246
403013	Nuapada	186	685	358	327	89	44	45	285	0	460	259	201
403014	Patala	525	2003	1020	983	204	103	101	631	0	1334	769	565
403015	Bankidi	307	1114	586	528	101	54	47	340	0	730	432	298
403016	Panuberani	111	316	148	168	32	16	16	13	14	224	113	111
403017	Dahanimara	21	73	33	40	10	4	6	55	0	40	23	17
403018	Khalapal	93	332	176	156	32	25	7	0	0	197	123	74
403019	Nagiaberani	49	179	88	91	26	13	13	86	11	78	45	33
403020	Iswarapur	61	241	132	109	25	15	10	0	0	189	108	81
403021	Gotiaberani	27	119	64	55	16	10	6	101	0	67	39	28
403022	Kantamila	133	449	238	211	51	31	20	0	0	285	170	115
403024	Mahalunda	349	1494	785	709	177	105	72	247	48	1011	588	423
403025	Bedanali	34	150	78	72	25	16	9	0	0	85	50	35
403026	Maguberani	112	396	207	189	51	34	17	0	0	270	144	126
403027	Krushnachandrapur	165	559	285	274	55	25	30	224	97	324	185	139
403029	Dudurokot	1350	5189	2687	2502	630	349	281	1167	224	3335	1915	1420
403030	Bramhanamara	231	939	482	457	101	56	45	129	81	611	352	259
403031	Kumurusinga	286	1276	636	640	129	65	64	339	31	916	489	427

VILLAGE WISE POPULATION AND LITERACY WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	No. of house-holds	Population break-up			Population (0-6 years)			Schedule Caste	Schedule Tribe	Literacy level		
			Total	Male	Female	Total	Male	Female			Total literates	Male literates	Female literates
403032	Ranjagola	714	2817	1440	1377	256	145	111	482	0	2009	1121	888
403033	Asarada	276	1061	543	518	124	67	57	273	0	800	456	344
403034	Balimi	227	889	466	423	78	39	39	54	4	685	396	289
403036	Sanahindol	201	749	377	372	99	45	54	171	0	527	292	235
403037	Nandapur	238	802	402	400	97	54	43	239	99	571	302	269
403043	Tangisal	90	346	192	154	44	28	16	77	0	278	157	121
	Sub total	**13830**	**55081**	**28274**	**26807**	**6242**	**3352**	**2890**	**12809**	**1698**	**37341**	**21359**	**15982**
Tehsil	**Gondia**												
403099	Karanda	1568	6778	3504	3274	716	386	330	1268	326	4730	2698	2032
	Sub total	**1568**	**6778**	**3504**	**3274**	**716**	**386**	**330**	**1268**	**326**	**4730**	**2698**	**2032**
District	**Angul**												
Tehsil	**Talcher**												
404033	Lingarakata	262	1278	695	583	128	68	60	212	106	987	588	399
	Sub total	**262**	**1278**	**695**	**583**	**128**	**68**	**60**	**212**	**106**	**987**	**588**	**399**
Tehsil	**Banarpal**												
404138	Bagachar	67	281	140	141	38	17	21	277	0	203	115	88
404139	Pandarbharania	4	11	5	6	2	2	0	11	0	9	3	6
404140	Majhika	11	45	23	22	1	0	1	45	0	38	22	16
404141	Tentulihata	180	768	402	366	129	74	55	755	0	567	307	260
404142	Apartipur	126	552	284	268	66	30	36	28	153	393	222	171
404143	Bonda	598	2694	1411	1283	275	148	127	170	23	1970	1107	863
404145	Banarpal	335	1522	769	753	176	87	89	632	25	1205	641	564
404146	Joragadia	87	389	204	185	44	27	17	0	0	270	152	118
404147	Birabahanpur	91	384	193	191	56	27	29	381	0	242	138	104
404148	Badakhali	88	362	192	170	41	21	20	53	90	248	147	101
404149	Bhagabatpur	169	725	394	331	84	46	38	90	137	507	307	200
404150	Narendrapur	92	405	209	196	47	26	21	90	235	313	169	144
404151	Chauridiha	189	892	445	447	74	41	33	78	0	632	341	291
404152	Jhajiribahal	212	994	508	486	111	63	48	212	23	715	411	304
404153	Gadasantri	883	3877	2062	1815	426	241	185	554	222	2689	1561	1128
404155	Gangijodi	42	149	82	67	18	10	8	29	5	106	59	47

VILLAGE WISE POPULATION AND LITERACY WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	No. of house-holds	Population break-up			Population (0-6 years)			Schedule Caste	Schedule Tribe	Literacy level		
			Total	Male	Female	Total	Male	Female			Total literates	Male literates	Female literates
404156	Tulasipal	683	3060	1561	1499	349	181	168	429	126	2179	1210	969
404160	Rajibpur	88	374	198	176	47	25	22	26	0	276	160	116
404163	Purkia	323	1284	674	610	127	73	54	82	9	947	533	414
404164	Arahat	403	1513	770	743	157	92	65	40	100	1078	604	474
404165	Talatali	384	1619	815	804	146	82	64	264	34	1104	615	489
404167	Kalandapal	71	303	175	128	35	23	12	43	0	218	139	79
404172	Rankasinga	120	554	276	278	60	35	25	143	39	419	221	198
404173	Juharpur	83	379	197	182	61	37	24	341	0	262	145	117
404174	Similichhuin	105	440	215	225	39	13	26	316	0	353	186	167
404175	Chakuriapal	20	73	33	40	8	3	5	8	0	63	30	33
404182	Gadatalamul	427	1813	939	874	197	104	93	629	242	1306	742	564
404192	Budhapanka (CT)	1265	6129	3162	2967	661	381	280	1225	615	4952	2471	2481
404193	Gotamara (CT)	1058	4823	2531	2292	586	318	268	1364	159	3801	2023	1778
404194	Nuahata (CT)	1301	5920	3146	2774	690	385	305	1516	76	4757	2485	2272
404195	Talabahal	179	673	351	322	110	64	46	620	28	503	270	233
404196	Ganthigadia	93	425	207	218	53	28	25	0	0	323	169	154
	Sub total	**9777**	**43432**	**22573**	**20859**	**4914**	**2704**	**2210**	**10451**	**2341**	**32648**	**17705**	**14943**
	GRAND TOTAL	**40805**	**170881**	**89198**	**81683**	**19376**	**10458**	**8918**	**39383**	**8977**	**121819**	**69052**	**52767**
	Percentage		**100.00**	**52.20**	**47.80**	**11.34**	**6.12**	**5.22**	**23.05**	**5.25**	**71.29**	**40.41**	**30.88**

VILLAGE WISE EMPLOYMENT PATTERN IN 10KM STUDY AREA (CENSUS 2011)

FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	Employment pattern											
		Total workers	Main workers					Marginal workers					Non workers
			Total	Cultivators	Agri. Labours	HH ind.	Others	Total	Cultivators	Agr. Labours	HH ind.	Others	
District	**Dhenkanal**												
Tehsil	**Parjang**												
402286	Palasahi	366	330	154	13	2	161	36	0	10	1	25	917
402287	Dihakamar	88	19	1	0	0	18	69	15	47	1	6	198
402288	Patarapada	965	291	37	200	10	44	674	101	432	12	129	2104
402289	Sankamar	216	39	11	1	0	27	177	4	166	1	6	441
402290	Gailo	268	35	24	2	2	7	233	6	224	1	2	586
402291	Kundandeipur	171	71	14	2	2	53	100	22	30	3	45	427
402292	Panibhandar	353	331	160	101	2	68	22	3	17	0	2	776
402293	Badakamar	174	69	24	9	0	36	105	7	49	1	48	347
402294	Katabahal	1138	546	238	107	19	182	592	18	327	27	220	1234
402305	Roda	667	538	92	86	113	247	129	2	71	7	49	1523
402308	Siarimalia	295	51	17	4	1	29	244	26	185	2	31	293
	Sub total	**4701**	**2320**	**772**	**525**	**151**	**872**	**2381**	**204**	**1558**	**56**	**563**	**8846**
Tehsil	**Odapada**												
402897	Kusupanga	553	409	31	8	0	370	144	13	9	1	121	1358
402898	Kurunti	1423	1317	160	34	21	1102	106	14	17	12	63	1487
402899	Kochilamada	342	191	12	89	12	78	151	19	78	18	36	772
402901	Charadagadia	300	243	19	7	1	216	57	6	13	0	38	535
402902	Tulasidihi	15	13	1	0	0	12	2	0	0	0	2	1
402904	Ghantalapasi	16	2	0	0	0	2	14	0	0	0	14	4
402905	Motunga	880	527	163	94	7	263	353	15	261	0	77	1003
402906	Kharagprasad	1444	977	53	37	60	827	467	12	85	41	329	3063
402907	Kharagprasadpatna	484	464	9	3	50	402	20	5	1	2	12	1212
402908	Suravi	244	209	42	8	2	157	35	3	16	0	16	521
402909	Bido	376	327	111	7	31	178	49	3	18	16	12	1031
402910	Taladanga	125	120	21	3	0	96	5	1	2	0	2	313
402911	Ranjasinga	600	415	75	49	16	275	185	13	1	0	171	656
402912	Rangathali	23	13	0	0	0	13	10	1	1	2	6	29
402913	Nagari	289	137	40	11	58	28	152	14	60	41	37	651
402914	Gaudapasi	42	32	3	2	24	3	10	3	0	3	4	82
402915	Chintapokhari	219	200	42	9	0	149	19	0	13	0	6	556
402916	Malibido	205	146	15	12	8	111	59	3	20	3	33	469
402917	Binakarkateni	168	135	17	16	1	101	33	2	4	2	25	419
402918	Budhapanka	263	237	26	82	83	46	26	1	1	12	12	406
402919	Brajabiharipur	74	65	1	22	1	41	9	0	3	0	6	156

VILLAGE WISE EMPLOYMENT PATTERN IN 10KM STUDY AREA (CENSUS 2011)

FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	Employment pattern											
		Total workers	Main workers					Marginal workers					Non workers
			Total	Cultivators	Agri. Labours	HH ind.	Others	Total	Cultivators	Agr. Labours	HH ind.	Others	
402920	Salapada	17	17	3	1	0	13	0	0	0	0	0	46
402922	Kunjabiharipur	300	10	0	0	0	10	290	0	246	0	44	231
402930	Uparbaghalunda	288	229	39	58	7	125	59	4	3	0	52	667
402931	Nayabhagirathipur(East	397	381	39	39	13	290	16	0	3	4	9	857
402932	Nayabhagirathipur(Wes	518	422	104	19	3	296	96	26	64	0	6	509
402933	Kalusahukateni	184	184	123	42	0	19	0	0	0	0	0	569
402934	Haladibahali	540	470	131	78	6	255	70	10	40	4	16	1122
402935	Budhipahad	187	105	0	1	0	104	82	0	11	1	70	305
402936	Uperpal	151	115	21	7	1	86	36	1	15	1	19	269
402937	Meramandali	482	459	95	13	2	349	23	2	8	1	12	895
402938	Nimidha	937	848	73	12	3	760	89	43	12	1	33	2181
402939	Ranibania	224	220	10	92	0	118	4	0	0	0	4	448
402940	Badalo	396	389	79	0	13	297	7	2	0	0	5	959
402964	Kamalanga	1735	1190	121	128	46	895	545	115	132	20	278	2785
402967	Mangalpur	2072	1934	163	26	16	1729	138	29	39	3	67	3376
402968	Itapa	99	99	7	0	1	91	0	0	0	0	0	236
402969	Narendrapur	1017	920	18	5	2	895	97	3	0	16	78	923
402970	Asanabania	58	58	0	0	0	58	0	0	0	0	0	163
402971	Sibapur	675	413	41	29	1	342	262	21	93	3	145	1138
	Sub total	**18362**	**14642**	**1908**	**1043**	**489**	**11202**	**3720**	**384**	**1269**	**207**	**1860**	**32403**
Tehsil	**Hindol**												
402972	Rakala	191	122	82	8	2	30	69	7	6	1	55	445
402973	Panaghudughuda	111	60	1	1	2	56	51	5	24	0	22	233
402974	Amana	497	353	56	15	10	272	144	17	32	4	91	924
402975	Sanjapada	598	446	71	139	13	223	152	4	10	0	138	1329
402976	Badibahal	163	131	1	16	1	113	32	2	15	0	15	355
402977	Khaliberana	209	195	2	0	1	192	14	4	2	0	8	614
402978	Nadeilo	166	115	8	1	0	106	51	1	0	18	32	363
402979	Bramhanapurunakot	206	117	6	0	0	111	89	7	22	1	59	421
402980	Naraharipur	50	39	13	1	1	24	11	3	3	4	1	148
402981	Chandrasekharpur	33	26	11	4	0	11	7	7	0	0	0	58
402982	Kankalu	381	155	14	5	78	58	226	25	182	10	9	829
402983	Mitikapasi	62	59	1	1	0	57	3	1	1	0	1	63
402984	Sarapa	151	109	2	0	0	107	42	6	4	2	30	335
402985	Raghunathapur	269	231	1	1	7	222	38	2	18	2	16	554
402986	Nuagan	345	309	60	113	5	131	36	1	1	1	33	630
402987	Mahatala	37	23	4	5	3	11	14	0	1	12	1	34

VILLAGE WISE EMPLOYMENT PATTERN IN 10KM STUDY AREA (CENSUS 2011)

FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	Employment pattern											
		Total workers	Main workers					Marginal workers					Non workers
			Total	Cultivators	Agri. Labours	HH ind.	Others	Total	Cultivators	Agr. Labours	HH ind.	Others	
402988	Kaliakoli	3	3	0	3	0	0	0	0	0	0	0	5
402989	Paikpurunakot	432	339	25	13	7	294	93	4	19	0	70	913
402991	Jhaduberani	128	64	4	0	2	58	64	27	37	0	0	259
402993	Beruanpal	414	372	72	8	5	287	42	18	22	0	2	803
402994	Gandijhara	62	10	2	0	0	8	52	4	39	0	9	156
402995	Galapada	575	179	25	6	64	84	396	16	214	49	117	647
402996	Bhanupada	94	67	2	3	14	48	27	0	3	2	22	199
402997	Chitipada	92	77	18	0	1	58	15	1	2	2	10	164
402998	Nimabahali	320	92	9	12	8	63	228	3	182	19	24	647
402999	Kothalu	196	95	14	2	10	69	101	2	5	29	65	183
403000	Jhadabandha	595	356	185	8	40	123	239	69	76	15	79	1040
403001	Madhupur	33	33	10	22	0	1	0	0	0	0	0	93
403002	Nua	641	382	135	73	0	174	259	3	176	0	80	1609
403003	Thokar	510	238	78	9	4	147	272	32	105	2	133	1211
403004	Barasingha	847	425	50	160	22	193	422	45	243	12	122	1608
403005	Tarkabeda	363	46	8	3	0	35	317	15	65	2	235	710
403006	Kadala	692	484	60	34	108	282	208	8	86	22	92	1437
403007	Benipathara	49	17	11	1	0	5	32	2	9	0	21	93
403008	Badamunda	279	197	47	22	0	128	82	33	30	0	19	370
403009	Kantimili	480	397	126	44	34	193	83	7	25	13	38	989
403010	Sanamunda	284	245	37	108	3	97	39	11	25	0	3	547
403011	Solanali	172	112	35	0	3	74	60	55	4	0	1	256
403012	Jharabeda	307	271	66	32	9	164	36	19	11	5	1	592
403013	Nuapada	247	230	63	125	1	41	17	4	11	0	2	438
403014	Patala	704	435	89	216	9	121	269	15	127	65	62	1299
403015	Bankidi	389	233	63	141	3	26	156	9	147	0	0	725
403016	Panuberani	69	67	16	13	10	28	2	0	1	0	1	247
403017	Dahanimara	18	16	0	8	0	8	2	1	0	0	1	55
403018	Khalapal	116	26	12	0	1	13	90	0	37	4	49	216
403019	Nagiaberani	60	4	1	1	0	2	56	0	27	4	25	119
403020	Iswarapur	76	34	7	0	0	27	42	2	38	0	2	165
403021	Gotiaberani	35	17	3	4	1	9	18	0	11	0	7	84
403022	Kantamila	158	113	0	112	0	1	45	0	43	1	1	291
403024	Mahalunda	806	448	95	77	13	263	358	24	32	69	233	688
403025	Bedanali	52	48	20	0	2	26	4	4	0	0	0	98
403026	Maguberani	139	133	28	27	8	70	6	1	2	0	3	257
403027	Krushnachandrapur	182	82	1	3	2	76	100	0	37	8	55	377
403029	Dudurokot	1833	759	119	260	16	364	1074	21	826	3	224	3356
403030	Bramhanamara	334	226	99	42	2	83	108	5	100	1	2	605
403031	Kumurusinga	691	159	49	14	0	96	532	13	502	0	17	585

VILLAGE WISE EMPLOYMENT PATTERN IN 10KM STUDY AREA (CENSUS 2011)

FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	Employment pattern											
		Total workers	Main workers					Marginal workers					Non workers
			Total	Cultivators	Agri. Labours	HH ind.	Others	Total	Cultivators	Agr. Labours	HH ind.	Others	
403032	Ranjagola	1005	226	31	7	8	180	779	67	424	70	218	1812
403033	Asarada	411	143	57	9	12	65	268	44	60	34	130	650
403034	Balimi	279	225	65	6	0	154	54	5	27	3	19	610
403036	Sanahindol	271	102	26	16	3	57	169	14	141	5	9	478
403037	Nandapur	258	153	9	24	11	109	105	2	83	4	16	544
403043	Tangisal	102	97	16	0	0	81	5	0	3	0	2	244
	Sub total	**19272**	**10967**	**2221**	**1978**	**559**	**6209**	**8305**	**697**	**4378**	**498**	**2732**	**35809**
Tehsil	**Gondia**												
403099	Karanda	2384	1882	361	56	71	1394	502	29	168	16	289	4394
	Sub total	**2384**	**1882**	**361**	**56**	**71**	**1394**	**502**	**29**	**168**	**16**	**289**	**4394**
District	**Angul**												
Tehsil	**Talcher**												
404033	Lingarakata	405	337	6	17	2	312	68	13	11	4	40	873
	Sub total	**405**	**337**	**6**	**17**	**2**	**312**	**68**	**13**	**11**	**4**	**40**	**873**
Tehsil	**Banarpal**												
404138	Bagachar	72	8	1	0	0	7	64	0	21	17	26	209
404139	Pandarbharania	3	0	0	0	0	0	3	0	3	0	0	8
404140	Majhika	11	6	1	0	2	3	5	0	3	0	2	34
404141	Tentulihata	198	165	52	12	96	5	33	12	2	7	12	570
404142	Apartipur	190	144	29	2	1	112	46	5	6	6	29	362
404143	Bonda	1043	686	60	5	65	556	357	24	100	11	222	1651
404145	Banarpal	484	458	54	107	20	277	26	4	3	6	13	1038
404146	Joragadia	136	93	13	10	51	19	43	3	28	11	1	253
404147	Birabahanpur	127	66	2	20	36	8	61	2	48	10	1	257
404148	Badakhali	128	110	2	40	16	52	18	4	4	3	7	234
404149	Bhagabatpur	409	280	56	11	0	213	129	62	22	0	45	316
404150	Narendrapur	123	110	14	0	0	96	13	1	0	1	11	282
404151	Chauridiha	303	157	18	3	9	127	146	19	12	9	106	589
404152	Jhajiribahal	292	283	37	12	2	232	9	1	0	0	8	702
404153	Gadasantri	1218	679	53	150	128	348	539	62	204	65	208	2659
404155	Gangijodi	57	45	12	1	0	32	12	2	6	0	4	92

VILLAGE WISE EMPLOYMENT PATTERN IN 10KM STUDY AREA (CENSUS 2011)

FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	Employment pattern											
		Total workers	Main workers					Marginal workers					Non workers
			Total	Cultivators	Agri. Labours	HH ind.	Others	Total	Cultivators	Agr. Labours	HH ind.	Others	
404156	Tulasipal	1012	900	213	279	7	401	112	10	65	2	35	2048
404160	Rajibpur	121	90	22	0	0	68	31	10	18	0	3	253
404163	Purkia	367	284	40	5	2	237	83	19	60	0	4	917
404164	Arahat	388	373	25	101	16	231	15	1	10	0	4	1125
404165	Talatali	444	413	37	31	5	340	31	2	19	5	5	1175
404167	Kalandapal	98	89	4	35	1	49	9	5	0	0	4	205
404172	Rankasinga	258	258	73	142	0	43	0	0	0	0	0	296
404173	Juharpur	88	88	65	0	0	23	0	0	0	0	0	291
404174	Similichhuin	170	167	59	99	2	7	3	0	3	0	0	270
404175	Chakuriapal	21	18	9	3	3	3	3	1	1	0	1	52
404182	Gadatalamul	467	313	16	15	25	257	154	26	33	11	84	1346
404192	Budhapanka (CT)	1888	1652	98	29	64	1461	236	38	74	18	106	4241
404193	Gotamara (CT)	1489	1285	48	36	68	1133	204	20	47	11	128	3335
404194	Nuahata (CT)	1904	1477	122	67	141	1147	427	13	92	19	303	4016
404195	Talabahal	219	168	6	12	4	146	51	6	11	2	32	454
404196	Ganthigadia	146	5	0	0	0	5	141	12	0	0	129	279
	Sub total	**13874**	**10870**	**1241**	**1227**	**764**	**7638**	**3004**	**364**	**895**	**214**	**1533**	**29559**
	GRAND TOTAL	**58998**	**41018**	**6509**	**4846**	**2036**	**27627**	**17980**	**1691**	**8279**	**995**	**7017**	**111884**
	Percentage	**34.53**	**24.00**	**15.87**	**11.81**	**4.96**	**67.35**	**10.52**	**9.40**	**46.05**	**5.53**	**39.03**	**65.47**

AMENITIES AVAILABLE IN VILLAGES WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	EDUCATION FACILITIES																										MEDICAL FACILITIES			
		PPS		PS		MS		SS		SSS		DCAS		EC		MC		MI		P		VTS/ITI		NFTC		SFD		EO		CHC	PHC	PHSC	MCWC
		Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.				
	District : Dhenkanal																														
	Tehsil : Parajang																														
402286	Palasahi	(5-10 km)	-	1	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(10+ km)	(10+ km)
402287	Dihakamar	(10+ km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402288	Patarapada	(10+ km)	-	3	-	1	-	1	-	-	2	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
402289	Sankamar	(10+ km)	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(10+ km)	(10+ km)
402290	Gailo	(10+ km)	-	1	-	1	1	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	1	1	(10+ km)	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(10+ km)	(10+ km)
402291	Kundandeipur	(10+ km)	-	1	-	1	-	1	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(10+ km)	(10+ km)
402292	Panibhandar	(10+ km)	-	2	-	1	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(5-10 km)	(<5 km)	(5-10 km)
402293	Badakamar	N.A.	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(<5 km)	(10+ km)	(5-10 km)
402294	Katabahal	(10+ km)	-	3	-	2	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(10+ km)	(5-10 km)
402305	Roda	(5-10 km)	-	2	-	1	-	1	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
402308	Siarimalia	(10+ km)	-	1	-	(5-10 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(<5 km)
	Tehsil : Odapada																														
402897	Kusupanga	(<5 km)	-	2	-	1	-	1	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
402898	Kurunti	(5-10 km)	-	1	1	1	1	-	1	1	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
402899	Kochilamada	(5-10 km)	-	1	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(5-10 km)	(10+ km)
402901	Charadagadia	(5-10 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402902	Tulasidihi	N.A.	-	(<5 km)	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(<5 km)	(5-10 km)	(10+ km)
402904	Ghantalapasi	N.A.	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
402905	Motunga	(<5 km)	-	2	-	1	-	1	-	1	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(5-10 km)	(<5 km)	1
402906	Kharagprasad	-	1	4	-	2	-	1	-	1	-	1	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	N.A.	-	(10+ km)	-	N.A.	-	N.A.	-	(10+ km)	(<5 km)	1	(10+ km)
402907	Kharagprasadpatna	(<5 km)	-	2	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402908	Suravi	(<5 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402909	Bido	(10+ km)	-	1	1	1	1	-	1	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	(5-10 km)
402910	Taladanga	(5-10 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	-	(<5 km)	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402911	Ranjasinga	(5-10 km)	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	N.A.	-	(<5 km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
402912	Rangathali	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402913	Nagari	(<5 km)	-	1	-	1	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(5-10 km)
402914	Gaudapasi	(10+ km)	-	1	-	(<5 km)	-	(5-10 km)	-	-	1	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402915	Chintapokhari	-	1	1	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(5-10 km)	(<5 km)	(10+ km)
402916	Malibido	(5-10 km)	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402917	Binakarkateni	N.A.	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
402918	Budhapanka	N.A.	-	1	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(<5 km)	(10+ km)
402919	Brajabiharipur	N.A.	-	1	-	(<5 km)	-	(<5 km)	-	-	1	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	-	1	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
402920	Salapada	N.A.	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	-	1	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	-	1	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(5-10 km)	(10+ km)
402922	Kunjabiharipur	N.A.	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402930	Uparbaghalunda	N.A.	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402931	Nayabhagirathipur(East	N.A.	-	1	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402932	Nayabhagirathipur(Wes	N.A.	-	1	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
402933	Kalusahukateni	N.A.	-	1	-	1	-	1	-	-	1	-	1	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(5-10 km)	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(5-10 km)
402934	Haladibahali	N.A.	-	2	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(5-10 km)	(5-10 km)
402935	Budhipahad	N.A.	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	1	-	1	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(5-10 km)
402936	Uperpal	(5-10 km)	-	1	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402937	Meramandali	(5-10 km)	-	1	-	1	-	1	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	1
402938	Nimidha	(<5 km)	-	1	1	1	1	-	1	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	1
402939	Ranibania	(10+ km)	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(<5 km)	(10+ km)

AMENITIES AVAILABLE IN VILLAGES WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	EDUCATION FACILITIES																										MEDICAL FACILITIES			
		PPS		PS		MS		SS		SSS		DCAS		EC		MC		MI		P		VTS/ITI		NFTC		SFD		EO		CHC	PHC	PHSC	MCWC
		Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.				
402940	Badalo	(<5 km)	-	1	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
402964	Kamalanga	N.A.	-	5	-	2	-	1	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
402967	Mangalpur	N.A.	-	4	-	1	-	1	-	1	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
402968	Itapa	N.A.	-	1	1	-	1	-	1	-	1	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	(5-10 km)	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
402969	Narendrapur	(<5 km)	-	2	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402970	Asanabania	(5-10 km)	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
402971	Sibapur	(5-10 km)	-	2	-	1	-	1	-	-	1	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
	Tehsil : Hindol																																
402972	Rakala	(5-10 km)	-	1	-	1	-	1	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
402973	Panaghudughuda	(5-10 km)	-	1	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402974	Amana	(5-10 km)	-	1	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402975	Sanjapada	(10+ km)	-	2	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402976	Badibahal	(10+ km)	-	1	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402977	Khaliberana	(10+ km)	-	1	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	1	(10+ km)
402978	Nadeilo	(5-10 km)	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402979	Bramhanapurunakot	(<5 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
402980	Naraharipur	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(<5 km)	(10+ km)
402981	Chandrasekharpur	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	(<5 km)	(5-10 km)	(10+ km)
402982	Kankalu	(<5 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(5-10 km)	(10+ km)
402983	Mitikapasi	(<5 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
402984	Sarapa	N.A.	-	1	-	-	1	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402985	Raghunathapur	(<5 km)	-	1	-	-	1	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
402986	Nuagan	(<5 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402987	Mahatala	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(<5 km)	(10+ km)
402988	Kaliakoli	N.A.	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
402989	Paikpurunakot	-	1	1	-	1	-	1	-	-	1	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
402991	Jhaduberani	(<5 km)	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
402993	Beruanpal	(10+ km)	-	2	-	1	-	1	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
402994	Gandijhara	(10+ km)	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
402995	Galapada	N.A.	-	1	-	1	-	1	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
402996	Bhanupada	(10+ km)	-	1	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)
402997	Chitipada	(10+ km)	-	1	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)
402998	Nimabahali	(10+ km)	-	1	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(5-10 km)
402999	Kothalu	(10+ km)	-	1	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)
403000	Jhadabandha	(10+ km)	-	2	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
403001	Madhupur	(10+ km)	-	1	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403002	Nua	(10+ km)	-	2	-	2	-	1	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
403003	Thokar	(10+ km)	-	2	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403004	Barasingha	(5-10 km)	-	2	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(5-10 km)
403005	Tarkabeda	(5-10 km)	-	1	-	1	-	1	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
403006	Kadala	(10+ km)	-	2	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(5-10 km)
403007	Benipathara	(10+ km)	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403008	Badamunda	(10+ km)	-	1	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403009	Kantimili	(<5 km)	-	1	-	1	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)
403010	Sanamunda	(5-10 km)	-	1	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
403011	Solanali	(<5 km)	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403012	Jharabeda	(5-10 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)

AMENITIES AVAILABLE IN VILLAGES WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	EDUCATION FACILITIES																										MEDICAL FACILITIES			
		PPS		PS		MS		SS		SSS		DCAS		EC		MC		MI		P		VTS/ITI		NFTC		SFD		EO		CHC	PHC	PHSC	MCWC
		Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.				
403013	Nuapada	(5-10 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)
403014	Patala	(<5 km)	-	3	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	(5-10 km)
403015	Bankidi	(5-10 km)	-	1	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)
403016	Panuberani	(<5 km)	-	1	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(<5 km)
403017	Dahanimara	(5-10 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(<5 km)
403018	Khalapal	(5-10 km)	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(<5 km)
403019	Nagiaberani	(5-10 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(5-10 km)
403020	Iswarapur	(5-10 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)
403021	Gotiaberani	(5-10 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(5-10 km)	(10+ km)	(<5 km)	(5-10 km)
403022	Kantamila	(5-10 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403024	Mahalunda	(5-10 km)	-	1	-	1	-	1	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)
403025	Bedanali	(5-10 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)
403026	Maguberani	(5-10 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)
403027	Krushnachandrapur	(5-10 km)	-	1	-	1	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(5-10 km)
403029	Dudurokot	(5-10 km)	-	4	-	2	-	1	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	1
403030	Bramhanamara	(5-10 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403031	Kumurusinga	(5-10 km)	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403032	Ranjagola	(<5 km)	-	3	-	2	-	1	-	1	-	1	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403033	Asarada	(5-10 km)	-	1	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
403034	Balimi	(<5 km)	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
403036	Sanahindol	(<5 km)	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403037	Nandapur	(5-10 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
403043	Tangisal	(5-10 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(10+ km)
	Tehsil : Gondia																																
403099	Karanda	(<5 km)	-	6	-	3	-	1	-	(<5 km)	-	(<5 km)	-	-	1	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
	District : Angul																																
	Tehsil : Talcher																																
404033	Lingarakata	(5-10 km)	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	-	N.A.	-	N.A.	-	N.A.	-	(5-10 km)	(10+ km)	(5-10 km)	(10+ km)
	Tehsil : Banarpal																																
404138	Bagachar	(5-10 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
404139	Pandarbharania	N.A.	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(5-10 km)	(10+ km)
404140	Majhika	(5-10 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
404141	Tentulihata	(5-10 km)	-	1	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(5-10 km)	(10+ km)
404142	Apartipur	(<5 km)	-	1	-	(5-10 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(10+ km)	(10+ km)
404143	Bonda	(<5 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(10+ km)	(10+ km)
404145	Banarpal	-	1	2	-	1	-	1	-	-	1	-	1	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	-	2	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	1	1	(10+ km)
404146	Joragadia	(<5 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
404147	Birabahanpur	(5-10 km)	-	1	-	-	1	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
404148	Badakhali	(5-10 km)	-	1	-	1	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(10+ km)	(10+ km)
404149	Bhagabatpur	(5-10 km)	-	1	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(10+ km)	(10+ km)
404150	Narendrapur	(5-10 km)	-	1	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(5-10 km)	(5-10 km)	(<5 km)	(10+ km)
404151	Chauridiha	(<5 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(5-10 km)
404152	Jhajiribahal	(5-10 km)	-	1	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	N.A.	-	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)
404153	Gadasantri	(5-10 km)	-	3	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	1	(10+ km)
404155	Gangijodi	(5-10 km)	-	(<5 km)	-	(5-10 km)	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(10+ km)	(10+ km)
404156	Tulasipal	(<5 km)	-	1	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	N.A.	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	1	(10+ km)
404160	Rajibpur	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)

AMENITIES AVAILABLE IN VILLAGES WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	EDUCATION FACILITIES																										MEDICAL FACILITIES			
		PPS		PS		MS		SS		SSS		DCAS		EC		MC		MI		P		VTS/ITI		NFTC		SFD		EO		CHC	PHC	PHSC	MCWC
		Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.	Govt.	Pvt.				
404163	Purkia	(10+ km)	-	1	-	1	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(<5 km)	-	N.A.	-	(10+ km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(10+ km)	(10+ km)
404164	Arahat	(5-10 km)	-	2	-	1	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	N.A.	-	-	1	-	1	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
404165	Talatali	(5-10 km)	-	2	-	1	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
404167	Kalandapal	(5-10 km)	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(10+ km)	(10+ km)
404172	Rankasinga	(<5 km)	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(10+ km)	(10+ km)
404173	Juharpur	(10+ km)	-	1	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(5-10 km)	-	N.A.	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
404174	Similichhuin	(5-10 km)	-	1	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)
404175	Chakuriapal	(<5 km)	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(5-10 km)	(10+ km)
404182	Gadatalamul	(<5 km)	-	2	-	1	-	1	-	(<5 km)	-	(<5 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(10+ km)	(<5 km)	(10+ km)
404195	Talabahal	(5-10 km)	-	1	-	1	-	1	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(<5 km)	(10+ km)
404196	Ganthigadia	(5-10 km)	-	1	-	(<5 km)	-	(5-10 km)	-	(5-10 km)	-	(5-10 km)	-	(<5 km)	-	(10+ km)	-	(10+ km)	-	(10+ km)	-	(5-10 km)	-	(10+ km)	-	(10+ km)	-	N.A.	-	(10+ km)	(<5 km)	(5-10 km)	(10+ km)

AMENITIES AVAILABLE IN VILLAGES WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	MEDICAL FACILITIES																DRINKING WATER FACILITY										POWER SUPPLY			
		TBC	HA	HAM	D	VH	MHC	FWC	NGMF-OP	NGMF-IOP	NGMF-C	NGMF-MBBS	NGMF-OD	NGMF-ND	NGMF-TPFH	NGMF-MS	NGMF-O	TWT	TWUT	CW	UW	HP	TW/ BW	S	R/C	T/P	WO	PSDU	PSIAU	PSCU	PSALL
	District : Dhenkanal																														
	Tehsil : Parajang																														
402286	Palasahi	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	Y	N	N
402287	Dihakamar	(5-10 km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
402288	Patarapada	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	N
402289	Sankamar	1	1	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402290	Gailo	(10+ km)	(10+ km)	(10+ km)	(10+ km)	1	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	N	N	Y	N	N	N
402291	Kundandeipur	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
402292	Panibhandar	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
402293	Badakamar	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402294	Katabahal	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	N	Y	Y	Y	Y	T	Y
402305	Roda	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	1	-	N	N	N	Y	Y	N	N	Y	Y	Y	Y	Y	T	Y
402308	Siarimalia	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
	Tehsil : Odapada																														
402897	Kusupanga	(10+ km)	(5-10 km)	(5-10 km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
402898	Kurunti	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402899	Kochilamada	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	N	Y	N	Y	N	N	N
402901	Charadagadia	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	N	Y	N	Y	N	N	N
402902	Tulasidihi	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N
402904	Ghantalapasi	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N
402905	Motunga	(10+ km)	1	(10+ km)	1	1	(10+ km)	1	-	-	-	1	-	-	-	-	-	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	T	Y
402906	Kharagprasad	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	3	-	N	Y	N	Y	Y	Y	N	Y	Y	N	Y	Y	T	Y
402907	Kharagprasadpatna	(10+ km)	(5-10 km)	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
402908	Suravi	(10+ km)	(<5 km)	(10+ km)	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	N	N	N
402909	Bido	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	1	-	-	-	3	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
402910	Taladanga	(10+ km)	(10+ km)	(10+ km)	1	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
402911	Ranjasinga	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
402912	Rangathali	(10+ km)	(<5 km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	N	N	Y	N	N	N
402913	Nagari	(10+ km)	(<5 km)	(10+ km)	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402914	Gaudapasi	(10+ km)	(5-10 km)	(5-10 km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	N	N	N	N
402915	Chintapokhari	(10+ km)	(<5 km)	(10+ km)	(5-10 km)	(<5 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
402916	Malibido	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
402917	Binakarkateni	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402918	Budhapanka	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402919	Brajabiharipur	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
402920	Salapada	(5-10 km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	N	N	N	N
402922	Kunjabiharipur	(5-10 km)	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	N	N	N	N
402930	Uparbaghalunda	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
402931	Nayabhagirathipur(East	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402932	Nayabhagirathipur(Wes	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	N	N	Y	N	N	N
402933	Kalusahukateni	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
402934	Haladibahali	(10+ km)	(10+ km)	(10+ km)	1	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
402935	Budhipahad	(<5 km)	(<5 km)	(10+ km)	(5-10 km)	(<5 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
402936	Uperpal	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402937	Meramandali	(10+ km)	1	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	1	-	-	-	1	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402938	Nimidha	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	Y	N	N	N	N	Y	N	N	N
402939	Ranibania	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y

AMENITIES AVAILABLE IN VILLAGES WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	MEDICAL FACILITIES																DRINKING WATER FACILITY										POWER SUPPLY			
		TBC	HA	HAM	D	VH	MHC	FWC	NGMF-OP	NGMF-IOP	NGMF-C	NGMF-MBBS	NGMF-OD	NGMF-ND	NGMF-TPFH	NGMF-MS	NGMF-O	TWT	TWUT	CW	UW	HP	TW/ BW	S	R/C	T/P	WO	PSDU	PSIAU	PSCU	PSALL
402940	Badalo	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(<5 km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	Y	N	N
402964	Kamalanga	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	Y	N	Y	Y	N	Y	Y	T	Y
402967	Mangalpur	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	Y
402968	Itapa	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
402969	Narendrapur	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
402970	Asanabania	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
402971	Sibapur	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	N	T	N
	Tehsil : Hindol																														
402972	Rakala	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	N	N
402973	Panaghudughuda	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	N	N	N	N
402974	Amana	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402975	Sanjapada	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402976	Badibahal	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
402977	Khaliberana	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
402978	Nadeilo	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402979	Bramhanapurunakot	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402980	Naraharipur	(10+ km)	(<5 km)	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	N	N	N	N	N	N
402981	Chandrasekharpur	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
402982	Kankalu	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402983	Mitikapasi	(10+ km)	(10+ km)	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402984	Sarapa	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402985	Raghunathapur	(10+ km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	N	N	N
402986	Nuagan	(10+ km)	(<5 km)	(<5 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	N	N	N
402987	Mahatala	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	N	N	Y	N	N	N
402988	Kaliakoli	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	N	N	N	N	N	N	N	N	N	N	N
402989	Paikpurunakot	(10+ km)	(10+ km)	(5-10 km)	1	1	(10+ km)	(10+ km)	-	-	-	-	-	-	-	3	-	N	Y	N	Y	Y	N	Y	Y	Y	N	Y	Y	T	Y
402991	Jhaduberani	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	N	N	N	N
402993	Beruanpal	(10+ km)	(5-10 km)	(<5 km)	(<5 km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	N	N	N
402994	Gandijhara	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	Y	Y	Y	N	Y	N	N	N
402995	Galapada	(10+ km)	(5-10 km)	(5-10 km)	1	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	N	N	N
402996	Bhanupada	(10+ km)	(10+ km)	(5-10 km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	N	N	N
402997	Chitipada	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402998	Nimabahali	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
402999	Kothalu	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403000	Jhadabandha	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403001	Madhupur	(10+ km)	(<5 km)	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	N	N	N	N
403002	Nua	(<5 km)	(<5 km)	(5-10 km)	(<5 km)	(<5 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	N	N	N	Y	Y	Y	N	T	N
403003	Thokar	(<5 km)	(<5 km)	(5-10 km)	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	Y	Y	N	T	N
403004	Barasingha	(5-10 km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
403005	Tarkabeda	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	N	Y	N	Y	N	N	N
403006	Kadala	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403007	Benipathara	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	N	Y	N	Y	N	N	N
403008	Badamunda	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403009	Kantimili	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
403010	Sanamunda	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
403011	Solanali	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403012	Jharabeda	(10+ km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y

AMENITIES AVAILABLE IN VILLAGES WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

Town/ village code	Town/village name	MEDICAL FACILITIES																DRINKING WATER FACILITY										POWER SUPPLY			
		TBC	HA	HAM	D	VH	MHC	FWC	NGMF-OP	NGMF-IOP	NGMF-C	NGMF-MBBS	NGMF-OD	NGMF-ND	NGMF-TPFH	NGMF-MS	NGMF-O	TWT	TWUT	CW	UW	HP	TW/ BW	S	R/C	T/P	WO	PSDU	PSIAU	PSCU	PSALL
403013	Nuapada	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403014	Patala	(5-10 km)	(5-10 km)	(<5 km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403015	Bankidi	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403016	Panuberani	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
403017	Dahanimara	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	N	Y	N	N	N	N	N
403018	Khalapal	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	N	Y	N	Y	N	N	N
403019	Nagiaberani	(10+ km)	(10+ km)	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403020	Iswarapur	(10+ km)	(10+ km)	(10+ km)	(<5 km)	(<5 km)	(5-10 km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403021	Gotiaberani	(10+ km)	(10+ km)	(<5 km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	N	Y	N	N	N	N	N
403022	Kantamila	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403024	Mahalunda	(10+ km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403025	Bedanali	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403026	Maguberani	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403027	Krushnachandrapur	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403029	Dudurokot	(5-10 km)	(5-10 km)	(5-10 km)	1	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	3	-	N	Y	N	Y	Y	Y	N	N	Y	N	Y	Y	T	Y
403030	Bramhanamara	(5-10 km)	(5-10 km)	(5-10 km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	N	N
403031	Kumurusinga	(5-10 km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	Y	Y	Y	T	Y
403032	Ranjagola	(<5 km)	(10+ km)	(5-10 km)	(5-10 km)	1	(10+ km)	1	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
403033	Asarada	(5-10 km)	(5-10 km)	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
403034	Balimi	(<5 km)	(<5 km)	(5-10 km)	(<5 km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
403036	Sanahindol	(<5 km)	(<5 km)	(5-10 km)	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
403037	Nandapur	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	Y	T	Y
403043	Tangisal	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
	Tehsil : Gondia																														
403099	Karanda	(<5 km)	(<5 km)	(<5 km)	(5-10 km)	(<5 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	Y	N	N	Y	N	Y	Y	T	Y
	District : Angul																														
	Tehsil : Talcher																														
404033	Lingarakata	(10+ km)	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N
	Tehsil : Banarpal																														
404138	Bagachar	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	N	N	Y	N	Y	N	N	N
404139	Pandarbharania	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404140	Majhika	(10+ km)	(5-10 km)	(10+ km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	N	N	Y	N	Y	N	N	N
404141	Tentulihata	(10+ km)	(5-10 km)	(5-10 km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404142	Apartipur	(10+ km)	(<5 km)	(<5 km)	(<5 km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	N	N	Y	N	Y	N	N	N
404143	Bonda	(10+ km)	(<5 km)	(<5 km)	(<5 km)	(<5 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404145	Banarpal	(10+ km)	(10+ km)	1	(<5 km)	1	(10+ km)	1	-	-	-	2	-	-	-	3	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	T	N
404146	Joragadia	(10+ km)	(<5 km)	(<5 km)	(5-10 km)	(<5 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404147	Birabahanpur	(10+ km)	(5-10 km)	(5-10 km)	(<5 km)	(5-10 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	Y	N	Y	N	Y	N	N	N
404148	Badakhali	(5-10 km)	(5-10 km)	(5-10 km)	(<5 km)	(<5 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404149	Bhagabatpur	(5-10 km)	(5-10 km)	(5-10 km)	(5-10 km)	(<5 km)	(5-10 km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404150	Narendrapur	(5-10 km)	(5-10 km)	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	N	N	Y	N	Y	N	N	N
404151	Chauridiha	(10+ km)	(<5 km)	(10+ km)	(5-10 km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404152	Jhajiribahal	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404153	Gadasantri	(10+ km)	(5-10 km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	3	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404155	Gangijodi	(5-10 km)	(5-10 km)	(<5 km)	(10+ km)	(<5 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404156	Tulasipal	(10+ km)	(<5 km)	(<5 km)	(5-10 km)	(10+ km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	3	-	N	Y	N	Y	Y	N	N	N	Y	N	Y	N	N	N
404160	Rajibpur	(10+ km)	(<5 km)	(<5 km)	(<5 km)	(<5 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	N	Y	N	Y	N	N	N

AMENITIES AVAILABLE IN VILLAGES WITHIN 10KM STUDY AREA (CENSUS 2011)
FOR EXPANSION OF FERRO ALLOYS PLANT, TULASIDIHA, ODISHA OF RUNGTA MINES LTD.

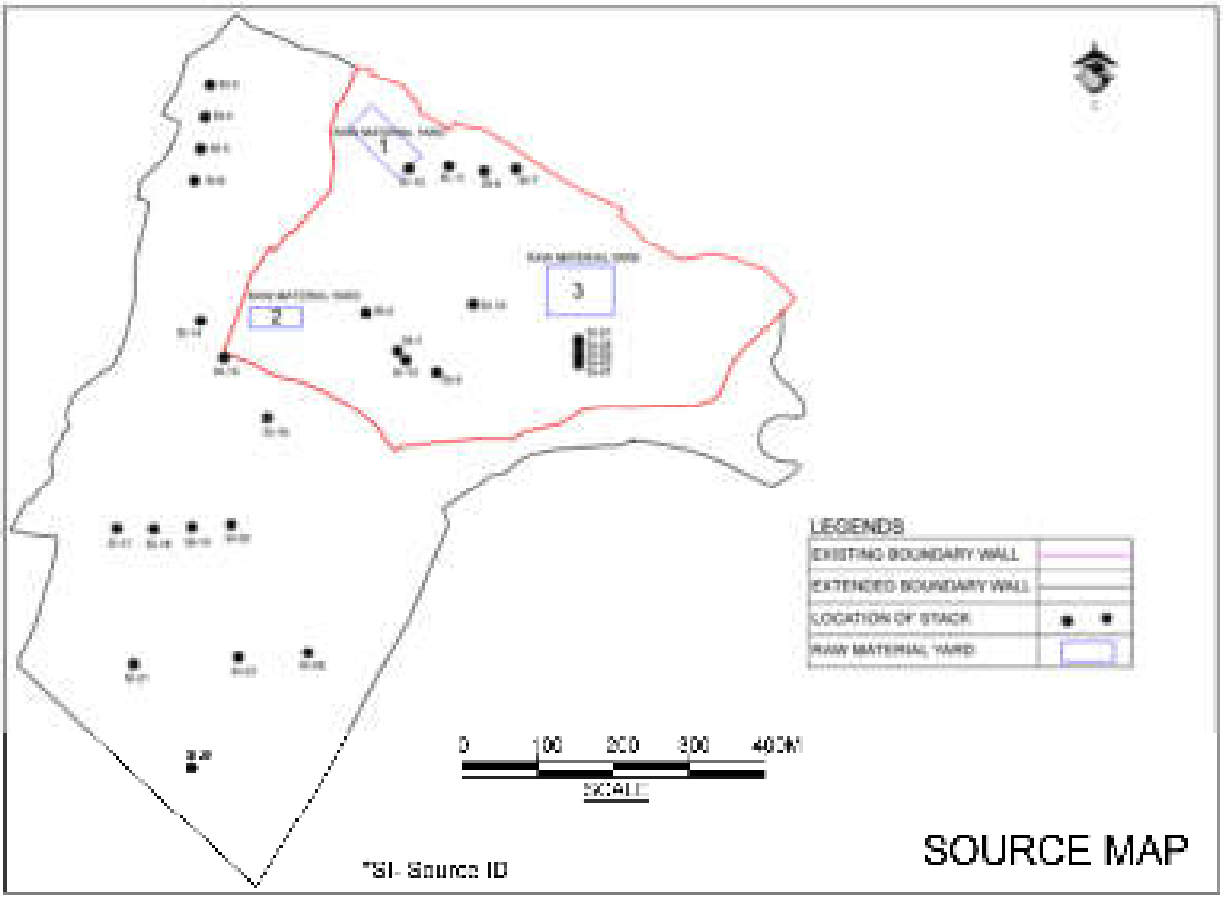
Town/ village code	Town/village name	MEDICAL FACILITIES																DRINKING WATER FACILITY										POWER SUPPLY			
		TBC	HA	HAM	D	VH	MHC	FWC	NGMF-OP	NGMF-IOP	NGMF-C	NGMF-MBBS	NGMF-OD	NGMF-ND	NGMF-TPFH	NGMF-MS	NGMF-O	TWT	TWUT	CW	UW	HP	TW/ BW	S	R/C	T/P	WO	PSDU	PSIAU	PSCU	PSALL
404163	Purkia	(10+ km)	(10+ km)	(5-10 km)	(<5 km)	(<5 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	N	N
404164	Arahat	(5-10 km)	(5-10 km)	(5-10 km)	(5-10 km)	(<5 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	N	N
404165	Talatali	(10+ km)	(5-10 km)	(5-10 km)	(<5 km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	Y	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
404167	Kalandapal	(10+ km)	(10+ km)	(<5 km)	(<5 km)	(10+ km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y	T	Y
404172	Rankasinga	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(<5 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	Y	Y	N	Y	Y	Y	N	Y	Y	T	Y
404173	Juharpur	(10+ km)	(10+ km)	(5-10 km)	(5-10 km)	(5-10 km)	(10+ km)	(10+ km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	N	Y	Y	N	Y	Y	T	Y
404174	Similichhuin	(10+ km)	(10+ km)	(10+ km)	(<5 km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	N	Y	Y	N	Y	Y	T	Y
404175	Chakuriapal	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(<5 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	N	N	Y	N	Y	Y	T	Y
404182	Gadatalamul	(10+ km)	(10+ km)	(5-10 km)	(10+ km)	(<5 km)	(10+ km)	(<5 km)	-	-	-	1	1	-	-	-	-	N	Y	N	N	Y	N	Y	N	Y	Y	Y	Y	T	Y
404195	Talabahal	(10+ km)	(5-10 km)	(5-10 km)	(5-10 km)	(5-10 km)	(10+ km)	(5-10 km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	N	N	Y	N	Y	N	N	N
404196	Ganthigadia	(10+ km)	(5-10 km)	(5-10 km)	(<5 km)	(5-10 km)	(10+ km)	(<5 km)	-	-	-	-	-	-	-	-	-	N	N	N	N	Y	N	N	N	Y	N	Y	N	N	N

ANNEXURE : XVII

Air quality prediction modeling due to plant operation - input & output data

```
CO STARTING
   TITLEONE TULASIDIHA FERRO ALLOY DIVISION
   TITLETWO POLLUTANT EMISSIONS FROM STACKS
   MODELOPT DFAULT CONC RURAL
   AVERTIME 1  24
   POLLUTID PM10
   RUNORNOT RUN
   TERRHGTS ELEV
 CO FINISHED
ME STARTING
   INPUTFIL ORI\TFAD\WithExpn\Normal\TFAD.MET
   ANEMHGHT 5.0
   SURFDATA 99999 2022 TULSIDIHA_FAD
   UAIRDATA 99999 2022 TULSIDIHA_FAD
   WDROTATE 180
 ME FINISHED
 OU STARTING
 OU RECTABLE ALLAVE FIRST
 OU MAXTABLE ALLAVE 50
 OU PLOTFILE 24 ALL FIRST
ORI\TFAD\WithExpn\Normal\TFADPM10.PLT
OU FINISHED
**********************************
 *** SETUP Finishes Successfully ***
 **********************************

**Misc. Inputs: Anem.Hgt. (m)= 5.00;  Decay Coef.= .0000; Rot. Angle= 180.0;
     Emission Units = GRAMS/SEC; Emission Rate Unit Factor = .10000E+07
                    Output Units = MICROGRAMS/M**3
```



Stacks considered:

Source ID	Description		Source ID	Description
	Point source :		17	500 TPD 1 Chrome Beneficiation
1	9 MVA SAF (Pig Iron)		18	500 TPD 2 Chrome Beneficiation
2	9 MVA SAF (Pig Iron)		19	500 TPD 3 Chrome Beneficiation
3	9 MVA SAF (Pig Iron)		20	500 TPD 4 Chrome Beneficiation
4	9 MVA SAF (Pig Iron)		21	2x20 MW (2x80 TPH) CFBC/AFBC
5	9 MVA SAF (Pig Iron)		22	2x20 MW (2x80 TPH) CFBC/AFBC
6	9 MVA SAF (Pig Iron)		25	1x20 MW (1x80 TPH) CFBC/AFBC
7	9 MVA SAF (Pig Iron)		26	2x25 MW (2x100 TPH) CFBC/AFBC
8	9 MVA SAF (Pig Iron)		27	DG-1 (500 KVA)

Air quality prediction modeling due to plant operation - input & output data

Source ID	Description		Source ID	Description
9	18 MVA SAF (Pig Iron)		28	DG-2 (500 KVA)
10	18 MVA SAF (Pig Iron)		29	DG-3 (1000 KVA)
11	18 MVA SAF (Pig Iron)		30	DG-4 (1000 KVA)
12	18 MVA SAF (Pig Iron)		31	DG-5 (1000 KVA)
13	Sinter Plant-Bagfilter (150 TPD)			**Area Source:**
14	Sinter Plant-Bagfilter (600 TPD)*		1	Raw Material yard
15	Sinter Plant-Bagfilter (600 TPD)*		2	Raw Material yard
16	Sinter Plant-Bagfilter (600 TPD)*		3	Raw Material yard

***or 5X120 TPD**

The air quality modelling has been carried out for normal, abnormal and emergency situations as prescribed in the Terms of Reference for metallurgical industry (point 4.ii(b)) for this project. The stack data have been assumed as follows:

*** POINT SOURCE DATA ***

TABLE 1: NORMAL OPERATION OF APCM (ASSUMING OPERATION AS PER DESIGN EFFICIENCY)

Source ID (SI)	EMISSION RATE (GRAMS/SEC) PM_{10}	$PM_{2.5}$	SO_2	NO_2	COORDINATES (UTM, 45Q) X (M)	Y (M)	BASE ELEV (M)	STACK HEIGHT (M)	STACK TEMP. (°K)	STACK EXIT VEL. (M/SEC)	STACK DIA. (M)	BUILDING EXISTS
1	1.86E-01	1.07E-01	6.94E-01	2.47E-01	322265.9	2300279	66.7	30	413	9.83	1.8	NO
2	1.86E-01	1.07E-01	6.94E-01	2.47E-01	322223.9	2300330	68.0	45	413	9.83	1.8	NO
3	1.86E-01	1.07E-01	6.94E-01	2.47E-01	322016.9	2300632	75.5	45	413	9.83	1.8	NO
4	1.86E-01	1.07E-01	6.94E-01	2.47E-01	322010.3	2300591	74.9	45	413	9.83	1.8	NO
5	1.86E-01	1.07E-01	6.94E-01	2.47E-01	322004.5	2300549	74.6	45	413	9.83	1.8	NO
6	1.86E-01	1.07E-01	6.94E-01	2.47E-01	321996.4	2300505	74.2	45	413	9.83	1.8	NO
7	1.86E-01	1.07E-01	6.94E-01	2.47E-01	322423.1	2300521	69.6	45	413	9.83	1.8	NO
8	1.86E-01	1.07E-01	6.94E-01	2.47E-01	322381.1	2300518	69.9	45	413	9.83	1.8	NO
9	2.48E-01	1.43E-01	1.39E+00	4.94E-01	322317.8	2300251	65.7	30	413	10.62	2.0	NO
10	2.48E-01	1.43E-01	1.39E+00	4.94E-01	322366.2	2300342	69.1	45	413	10.62	2.0	NO
11	2.48E-01	1.43E-01	1.39E+00	4.94E-01	322333.9	2300525	69.9	45	413	10.62	2.0	NO
12	2.48E-01	1.43E-01	1.39E+00	4.94E-01	322281.3	2300522	69.7	45	413	10.62	2.0	NO
13	1.69E-01	9.72E-02	1.09E-01	-	322277.1	2300267	66.6	30	323	6.99	1.8	NO
14	2.22E-01	1.28E-01	4.38E-01	-	322004.4	2300319	70.0	45	323	7.43	2.0	NO
15	2.22E-01	1.28E-01	4.38E-01	-	322035.8	2300271	68.0	45	323	7.43	2.0	NO
16	2.22E-01	1.28E-01	4.38E-01	-	322092.9	2300190	63.6	45	323	7.43	2.0	NO
17	1.64E-01	9.42E-02	-	-	321893.2	2300043	66.0	30	373	6.34	2.0	NO
18	1.64E-01	9.42E-02	-	-	321942.4	2300043	64.7	30	373	6.34	2.0	NO
19	1.64E-01	9.42E-02	-	-	321993.1	2300045	64.1	30	373	6.34	2.0	NO
20	1.64E-01	9.42E-02	-	-	322045.2	2300048	63.6	30	373	6.34	2.0	NO
21	1.01E+00	5.80E-01	8.96E+00	8.96E+00	321879.0	2299859	88.0	90	423	17.28	3.2	NO
22	1.01E+00	5.80E-01	8.96E+00	8.96E+00	322012.0	2299869	85.0	90	423	17.28	3.2	NO
25	2.42E-01	1.39E-01	2.15E+00	2.15E+00	321992.7	2299726	66.2	90	423	16.59	1.6	NO
26	1.07E+00	6.17E-01	9.54E+00	9.54E+00	322146.9	2299878	63.7	110	423	18.38	3.2	NO
27	4.17E-04	2.40E-04	2.48E-03	4.44E-02	322506.5	2300299	88	10	737	29.4	0.25	NO
28	4.17E-04	2.40E-04	2.48E-03	4.44E-02	322506.5	2300298	88	10	737	29.4	0.25	NO
29	8.33E-04	4.79E-04	3.09E-03	8.89E-02	322506.3	2300296	88	10	770	37.3	0.25	NO
30	8.33E-04	4.79E-04	3.09E-03	8.89E-02	322506.2	2300294	88	10	770	37.3	0.25	NO
31	8.33E-04	4.79E-04	3.09E-03	8.89E-02	322506	2300293	88	10	770	37.3	0.25	NO

AREA SOURCE

Source ID		Emission rate (g/s/m²) PM_{10}	$PM_{2.5}$	Co-ord (SW Corner) X (m)	Y (m)	Base Elev (m)	Rel. Ht. (m)	Dimension of area (m) X	Y	Orientation of area (Deg)	Init sz (m)
	Present working										
A1	Raw Material yard	9.37E-10	5.39E-10	322200.9	2300576	70.9	1	93.50	43.28	46	1.5
	After Expansion										
A1	Raw Material yard	2.18E-09	1.26E-09	322200.9	2300576	70.9	1	93.50	43.28	46	1.5
A2	Raw Material yard	2.77E-09	1.60E-09	322069.3	2300309	68.2	1	69.09	28.30	0	1.5
A3	Raw Material yard	1.95E-09	1.12E-09	322464.4	2300328	68.2	1	88.23	64.37	0	1.5

Air quality prediction modeling due to plant operation - input & output data

TABLE 2: ABNORMAL OPERATION OF APCM (ASSUMING 10% DECLINE IN ALL APCM WITH RESPECT TO DESIGN EFFICIENCY)

Source ID (SI)	EMISSION RATE (GRAMS/SEC) PM_{10}	$PM_{2.5}$	SO_2	NO_2	COORDINATES (UTM, 45Q) X (M)	Y (M)	BASE ELEV (M)	STACK HEIGHT (M)	STACK TEMP. (°K)	STACK EXIT VEL. (M/SEC)	STACK DIA. (M)	BUILDING EXISTS
1	2.05E-01	1.18E-01	7.63E-01	2.71E-01	322265.9	2300279	66.7	30	413	9.83	1.8	NO
2	2.05E-01	1.18E-01	7.63E-01	2.71E-01	322223.9	2300330	68.0	45	413	9.83	1.8	NO
3	2.05E-01	1.18E-01	7.63E-01	2.71E-01	322016.9	2300632	75.5	45	413	9.83	1.8	NO
4	2.05E-01	1.18E-01	7.63E-01	2.71E-01	322010.3	2300591	74.9	45	413	9.83	1.8	NO
5	2.05E-01	1.18E-01	7.63E-01	2.71E-01	322004.5	2300549	74.6	45	413	9.83	1.8	NO
6	2.05E-01	1.18E-01	7.63E-01	2.71E-01	321996.4	2300505	74.2	45	413	9.83	1.8	NO
7	2.05E-01	1.18E-01	7.63E-01	2.71E-01	322423.1	2300521	69.6	45	413	9.83	1.8	NO
8	2.05E-01	1.18E-01	7.63E-01	2.71E-01	322381.1	2300518	69.9	45	413	9.83	1.8	NO
9	2.73E-01	1.57E-01	1.53E+00	5.43E-01	322317.8	2300251	65.7	30	413	10.62	2.0	NO
10	2.73E-01	1.57E-01	1.53E+00	5.43E-01	322366.2	2300342	69.1	45	413	10.62	2.0	NO
11	2.73E-01	1.57E-01	1.53E+00	5.43E-01	322333.9	2300525	69.9	45	413	10.62	2.0	NO
12	2.73E-01	1.57E-01	1.53E+00	5.43E-01	322281.3	2300522	69.7	45	413	10.62	2.0	NO
13	1.86E-01	1.07E-01	1.20E-01	-	322277.1	2300267	66.6	30	323	6.99	1.8	NO
14	2.44E-01	1.40E-01	4.81E-01	-	322004.4	2300319	70.0	45	323	7.43	2.0	NO
15	2.44E-01	1.40E-01	4.81E-01	-	322035.8	2300271	68.0	45	323	7.43	2.0	NO
16	2.44E-01	1.40E-01	4.81E-01	-	322092.9	2300190	63.6	45	323	7.43	2.0	NO
17	1.80E-01	1.04E-01	-	-	321893.2	2300043	66.0	30	373	6.34	2.0	NO
18	1.80E-01	1.04E-01	-	-	321942.4	2300043	64.7	30	373	6.34	2.0	NO
19	1.80E-01	1.04E-01	-	-	321993.1	2300045	64.1	30	373	6.34	2.0	NO
20	1.80E-01	1.04E-01	-	-	322045.2	2300048	63.6	30	373	6.34	2.0	NO
21	1.11E+00	6.38E-01	9.86E+00	9.86E+00	321879.0	2299859	88.0	90	423	17.28	3.2	NO
22	1.11E+00	6.38E-01	9.86E+00	9.86E+00	322012.0	2299869	85.0	90	423	17.28	3.2	NO
25	2.66E-01	1.53E-01	2.37E+00	2.37E+00	321992.7	2299726	66.2	90	423	16.59	1.6	NO
26	1.18E+00	6.79E-01	1.05E+01	1.05E+01	322146.9	2299878	63.7	110	423	18.38	3.2	NO
27	4.58E-04	2.64E-04	2.73E-03	4.89E-02	322506.5	2300299	88	10	737	29.4	0.25	NO
28	4.58E-04	2.64E-04	2.73E-03	4.89E-02	322506.5	2300298	88	10	737	29.4	0.25	NO
29	9.17E-04	5.27E-04	3.40E-03	9.78E-02	322506.3	2300296	88	10	770	37.3	0.25	NO
30	9.17E-04	5.27E-04	3.40E-03	9.78E-02	322506.2	2300294	88	10	770	37.3	0.25	NO
31	9.17E-04	5.27E-04	3.40E-03	9.78E-02	322506	2300293	88	10	770	37.3	0.25	NO

AREA SOURCE

Source ID		Emission rate (g/s/m²) PM_{10}	$PM_{2.5}$	Co-ord (SW Corner) X (m)	Y (m)	Base Elev (m)	Rel. Ht. (m)	Dimension of area (m) X	Y	Orientation of area (Deg)	Init sz (m)
	Present working										
A1	Raw Material yard	1.03E-09	5.93E-10	322200.9	2300576	70.9	1	93.50	43.28	46	1.5
	After Expansion										
A1	Raw Material yard	2.40E-09	1.38E-09	322200.9	2300576	70.9	1	93.50	43.28	46	1.5
A2	Raw Material yard	3.05E-09	1.76E-09	322069.3	2300309	68.2	1	69.09	28.30	0	1.5
A3	Raw Material yard	2.15E-09	1.23E-09	322464.4	2300328	68.2	1	88.23	64.37	0	1.5

TABLE 3: EMERGENCY IN CASE OF FAILURE OF APCM OF STACK 26 WHICH HAS PEAK EMISSIONS

Source ID	EMISSION RATE (GRAMS/SEC) PM_{10}	$PM_{2.5}$	COORDINATES (UTM, 45Q) X (M)	Y (M)	BASE ELEV (M)	STACK HEIGHT (M)	STACK TEMP. (°K)	STACK EXIT VEL. (M/SEC)	STACK DIA. (M)	BUILDING EXISTS
1	1.86E-01	1.07E-01	322265.9	2300279	66.7	30	413	9.83	1.8	NO
2	1.86E-01	1.07E-01	322223.9	2300330	68.0	45	413	9.83	1.8	NO
3	1.86E-01	1.07E-01	322016.9	2300632	75.5	45	413	9.83	1.8	NO
4	1.86E-01	1.07E-01	322010.3	2300591	74.9	45	413	9.83	1.8	NO
5	1.86E-01	1.07E-01	322004.5	2300549	74.6	45	413	9.83	1.8	NO
6	1.86E-01	1.07E-01	321996.4	2300505	74.2	45	413	9.83	1.8	NO
7	1.86E-01	1.07E-01	322423.1	2300521	69.6	45	413	9.83	1.8	NO
8	1.86E-01	1.07E-01	322381.1	2300518	69.9	45	413	9.83	1.8	NO
9	2.48E-01	1.43E-01	322317.8	2300251	65.7	30	413	10.62	2.0	NO

ANNEXURE : XVII Contd.

Air quality prediction modeling due to plant operation - input & output data

Source ID	EMISSION RATE (GRAMS/SEC) PM_{10}	$PM_{2.5}$	COORDINATES (UTM, 45Q) X (M)	Y (M)	BASE ELEV (M)	STACK HEIGHT (M)	STACK TEMP. (°K)	STACK EXIT VEL. (M/SEC)	STACK DIA. (M)	BUILDING EXISTS
10	2.48E-01	1.43E-01	322366.2	2300342	69.1	45	413	10.62	2.0	NO
11	2.48E-01	1.43E-01	322333.9	2300525	69.9	45	413	10.62	2.0	NO
12	2.48E-01	1.43E-01	322281.3	2300522	69.7	45	413	10.62	2.0	NO
13	1.69E-01	9.72E-02	322277.1	2300267	66.6	30	323	6.99	1.8	NO
14	2.22E-01	1.28E-01	322004.4	2300319	70.0	45	323	7.43	2.0	NO
15	2.22E-01	1.28E-01	322035.8	2300271	68.0	45	323	7.43	2.0	NO
16	2.22E-01	1.28E-01	322092.9	2300190	63.6	45	323	7.43	2.0	NO
17	1.64E-01	9.42E-02	321893.2	2300043	66.0	30	373	6.34	2.0	NO
18	1.64E-01	9.42E-02	321942.4	2300043	64.7	30	373	6.34	2.0	NO
19	1.64E-01	9.42E-02	321993.1	2300045	64.1	30	373	6.34	2.0	NO
20	1.64E-01	9.42E-02	322045.2	2300048	63.6	30	373	6.34	2.0	NO
21	1.01E+00	5.80E-01	321879.0	2299859	88.0	90	423	17.28	3.2	NO
22	1.01E+00	5.80E-01	322012.0	2299869	85.0	90	423	17.28	3.2	NO
25	2.42E-01	1.39E-01	321992.7	2299726	66.2	90	423	16.59	1.6	NO
26	**1.07E+03**	**6.17E+02**	**322146.9**	**2299878**	**63.7**	**110**	**423**	**18.38**	**3.2**	**NO**
27	4.17E-04	2.40E-04	322506.5	2300299	88	10	737	29.4	0.25	NO
28	4.17E-04	2.40E-04	322506.5	2300298	88	10	737	29.4	0.25	NO
29	8.33E-04	4.79E-04	322506.3	2300296	88	10	770	37.3	0.25	NO
30	8.33E-04	4.79E-04	322506.2	2300294	88	10	770	37.3	0.25	NO
31	8.33E-04	4.79E-04	322506	2300293	88	10	770	37.3	0.25	NO

AREA SOURCE

Source ID		Emission rate (g/s/m²) PM_{10}	$PM_{2.5}$	Co-ord (SW Corner) X (m)	Y (m)	Base Elev (m)	Rel. Ht. (m)	Dimension of area (m) X	Y	Orientation of area (Deg)	Init sz (m)
	Present working										
A1	Raw Material yard	9.37E-10	5.39E-10	322200.9	2300576	70.9	1	93.50	43.28	46	1.5
	After Expansion										
A1	Raw Material yard	2.18E-09	1.26E-09	322200.9	2300576	70.9	1	93.50	43.28	46	1.5
A2	Raw Material yard	2.77E-09	1.60E-09	322069.3	2300309	68.2	1	69.09	28.30	0	1.5
A3	Raw Material yard	1.95E-09	1.12E-09	322464.4	2300328	68.2	1	88.23	64.37	0	1.5

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: ORI\TFAD\WithExpn\Normal\TFAD.MET FORMAT:(4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)

SURFACE STATION NO.: 99999 UPPER AIR STATION NO.: 99999

NAME: TULSIDIHA_FAD NAME: TULSIDIHA_FAD

YEAR: 2022 YEAR: 2022

YEAR	MONTH	DAY	HOUR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
22	2	28	24	328.8	.33	298.0	6	393.0	393.0	.0000	.0	.0000	0	.00
22	3	1	1	338.0	.38	297.4	6	333.0	333.0	.0000	.0	.0000	0	.00
22	3	1	2	344.2	.41	297.0	6	333.0	333.0	.0000	.0	.0000	0	.00
22	3	1	3	349.1	.43	296.7	6	303.0	303.0	.0000	.0	.0000	0	.00
22	3	1	4	346.9	.43	296.5	6	283.0	283.0	.0000	.0	.0000	0	.00
22	3	1	5	336.8	.40	296.3	6	228.0	228.0	.0000	.0	.0000	0	.00
22	3	1	6	140.2	.13	296.1	1	85.0	85.0	.0000	.0	.0000	0	.00
22	3	1	7	287.8	.44	297.4	1	90.0	90.0	.0000	.0	.0000	0	.00
22	3	1	8	339.7	.59	299.6	1	313.0	313.0	.0000	.0	.0000	0	.00
22	3	1	9	102.1	.52	303.3	1	563.0	563.0	.0000	.0	.0000	0	.00
22	3	1	10	282.8	.17	304.8	1	868.0	868.0	.0000	.0	.0000	0	.00
22	3	1	11	173.1	.44	305.8	1	1200.0	1200.0	.0000	.0	.0000	0	.00
22	3	1	12	173.9	.84	306.4	1	1438.0	1438.0	.0000	.0	.0000	0	.00
22	3	1	13	180.4	1.10	306.7	1	1675.0	1675.0	.0000	.0	.0000	0	.00
22	3	1	14	190.2	1.34	306.5	1	1625.0	1625.0	.0000	.0	.0000	0	.00
22	3	1	15	194.3	1.60	306.0	1	1700.0	1700.0	.0000	.0	.0000	0	.00
22	3	1	16	197.8	1.67	305.2	1	1525.0	1525.0	.0000	.0	.0000	0	.00
22	3	1	17	206.2	1.06	303.4	1	1375.0	1375.0	.0000	.0	.0000	0	.00
22	3	1	18	220.7	.91	301.2	1	1075.0	1075.0	.0000	.0	.0000	0	.00
22	3	1	19	238.2	.94	300.4	1	700.0	700.0	.0000	.0	.0000	0	.00
22	3	1	20	261.9	1.00	299.7	6	663.0	663.0	.0000	.0	.0000	0	.00
22	3	1	21	287.2	1.21	298.9	6	488.0	488.0	.0000	.0	.0000	0	.00
22	3	1	22	124.6	0.55	298.2	6	428.0	428.0	.0000	.0	.0000	0	.00
22	3	1	23	135.6	0.56	297.3	6	408.0	408.0	.0000	.0	.0000	0	.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.; FLOW VECTOR IS DIRECTION TOWARD WIND IS BLOWING.

Air quality prediction modeling due to plant operation - input & output data

RECEPTOR WISE GROUND LEVEL CONCENTRATIONS (µg/m^3)

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m^3)																	
					PM_{10}					$PM_{2.5}$					SO_2				NO_2			
					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
1	0 m N	322138.3	2300682	73.7	1.15	3.82	2.67	4.20	219.70	0.66	2.20	1.53	2.42	126.33	1.29	9.74	8.45	10.72	0.79	5.69	4.90	6.26
2	0 m NNE	322308.7	2300589	69.3	1.38	4.56	3.18	5.02	97.94	0.80	2.62	1.83	2.88	56.32	1.20	8.44	7.23	9.28	0.73	4.27	3.55	4.70
3	0 m NE	322474.3	2300514	69	1.59	5.65	4.07	6.22	87.95	0.91	3.25	2.34	3.58	50.57	1.21	11.30	10.10	12.44	0.81	5.77	4.96	6.35
4	0 m ENE	322691.6	2300407	64	1.55	4.97	3.43	5.47	229.58	0.89	2.86	1.97	3.15	132.01	1.63	10.94	9.30	12.03	0.90	9.50	8.61	10.45
5	0 m E	322749.9	2300178	63.3	0.97	3.17	2.20	3.49	87.40	0.56	1.82	1.26	2.01	50.25	1.24	9.82	8.58	10.80	1.18	6.19	5.02	6.81
6	0 m ESE	322353.8	2300089	62.9	0.35	2.31	1.96	2.54	2.31	0.20	1.33	1.13	1.46	1.33	0.23	5.67	5.44	6.23	0.52	1.96	1.44	2.16
7	0 m SE	322313.7	2300002	63.1	0.82	3.70	2.88	4.07	3.70	0.47	2.13	1.66	2.34	2.13	0.58	7.72	7.14	8.49	0.57	2.30	1.73	2.53
8	0 m SSE	322260.1	2299884	64.4	0.82	2.52	1.70	2.77	2.52	0.47	1.45	0.98	1.59	1.45	0.76	5.15	4.39	5.66	0.44	2.00	1.56	2.20
9	0 m S	322138.3	2299666	64	0.58	2.42	1.84	2.67	2.42	0.33	1.39	1.06	1.53	1.39	0.87	5.48	4.62	6.03	0.46	1.87	1.40	2.05
10	0 m SSW	321939.1	2299697	67.3	0.95	2.64	1.69	2.91	2.64	0.54	1.52	0.97	1.67	1.52	1.50	8.10	6.60	8.91	0.88	3.04	2.16	3.34
11	0 m SW	321792.9	2299832	70	1.09	5.66	4.58	6.23	5.66	0.63	3.26	2.63	3.58	3.26	1.63	13.62	11.99	14.98	0.94	3.41	2.47	3.75
12	0 m WSW	321791.3	2300034	68.1	1.20	4.95	3.75	5.44	4.95	0.69	2.84	2.16	3.13	2.84	1.66	13.70	12.04	15.07	0.90	3.57	2.67	3.93
13	0 m W	321830	2300178	64.2	1.76	4.08	2.31	4.48	4.08	1.01	2.34	1.33	2.58	2.34	2.13	10.56	8.43	11.62	1.09	3.63	2.54	4.00
14	0 m WNW	321896.9	2300278	67.3	1.63	2.40	0.77	2.64	2.38	0.94	1.38	0.44	1.52	1.37	1.76	6.19	4.43	6.81	0.92	2.97	2.05	3.26
15	0 m NW	321918.8	2300397	71.6	1.19	2.45	1.25	2.69	10.13	0.69	1.41	0.72	1.55	5.83	1.14	5.10	3.96	5.61	0.65	2.49	1.83	2.74
16	0 m NNW	321960.6	2300607	74.8	2.28	4.76	2.48	5.23	152.08	1.31	2.73	1.42	3.01	87.45	2.84	10.97	8.13	12.07	1.38	5.62	4.24	6.18
17	100m N	322138.3	2300792	72.6	1.14	3.57	2.43	3.93	242.98	0.66	2.05	1.40	2.26	139.71	1.56	11.40	9.84	12.54	0.73	6.84	6.11	7.52
18	100m NNE	322352	2300694	68.4	1.09	3.89	2.80	4.28	157.28	0.62	2.23	1.61	2.46	90.43	1.26	8.64	7.38	9.50	0.92	5.62	4.70	6.18
19	100m NE	322547.3	2300587	68.5	1.45	4.90	3.45	5.39	150.02	0.84	2.82	1.98	3.10	86.26	1.50	12.69	11.19	13.95	0.79	7.50	6.71	8.25
20	100m ENE	322821.8	2300461	64.8	1.29	4.58	3.29	5.03	305.79	0.74	2.63	1.89	2.89	175.83	1.87	14.22	12.35	15.64	1.47	10.08	8.61	11.09
21	100m E	322903.4	2300178	65	0.83	3.37	2.54	3.71	187.26	0.48	1.94	1.46	2.13	107.67	1.14	12.76	11.62	14.04	1.08	8.49	7.41	9.34
22	100m ESE	322470.9	2300040	63.6	1.87	4.25	2.38	4.68	4.25	1.08	2.44	1.37	2.69	2.44	1.38	8.24	6.86	9.06	0.22	1.61	1.39	1.77
23	100m SE	322390.6	2299925	63.4	0.78	4.35	3.58	4.79	4.35	0.45	2.50	2.06	2.75	2.50	0.54	8.89	8.34	9.77	0.35	1.72	1.37	1.89
24	100m SSE	322309.1	2299765	62.4	0.85	3.09	2.24	3.40	3.09	0.49	1.77	1.29	1.95	1.77	1.07	6.25	5.19	6.88	0.47	2.11	1.64	2.32
25	100m S	322138.3	2299491	64.8	0.42	2.16	1.73	2.37	2.16	0.24	1.24	1.00	1.36	1.24	0.70	4.40	3.70	4.84	0.40	1.56	1.15	1.71
26	100m SSW	321898.4	2299599	66.9	0.72	2.39	1.67	2.63	2.39	0.41	1.37	0.96	1.51	1.37	1.19	6.48	5.29	7.13	0.72	2.49	1.77	2.74
27	100m SW	321722.1	2299762	70.7	0.92	5.75	4.82	6.32	5.75	0.53	3.31	2.77	3.64	3.31	1.44	11.96	10.53	13.16	0.84	3.12	2.28	3.43
28	100m WSW	321669.3	2299983	71	1.01	5.90	4.88	6.48	5.90	0.58	3.39	2.81	3.73	3.39	1.56	13.97	12.41	15.37	0.87	3.73	2.86	4.11
29	100m W	321714.7	2300178	65	1.45	5.85	4.40	6.43	8.96	0.83	3.36	2.53	3.70	5.15	2.06	15.55	13.50	17.11	1.12	3.96	2.84	4.36
30	100m WNW	321797.5	2300319	70.2	1.52	4.46	2.94	4.90	34.56	0.87	2.56	1.69	2.82	19.87	2.13	9.97	7.84	10.96	1.16	3.45	2.29	3.80
31	100m NW	321821.2	2300495	72.9	0.95	4.93	3.98	5.42	91.75	0.55	2.84	2.29	3.12	52.75	1.22	10.29	9.07	11.32	0.67	3.40	2.73	3.74
32	100m NNW	321908.4	2300733	77.5	1.93	4.12	2.19	4.53	198.73	1.11	2.37	1.26	2.61	114.27	2.83	11.70	8.87	12.87	1.46	7.09	5.63	7.80
33	200m N	322138.3	2300906	71	0.96	3.31	2.35	3.64	233.33	0.55	1.90	1.35	2.09	134.17	1.43	12.34	10.90	13.57	0.73	7.33	6.60	8.06
34	200m NNE	322392.7	2300792	67.6	0.85	3.22	2.37	3.54	184.83	0.49	1.85	1.36	2.03	106.28	1.18	9.31	8.13	10.24	1.00	6.48	5.48	7.12
35	200m NE	322622.3	2300662	64	1.22	4.23	3.01	4.65	190.16	0.70	2.43	1.73	2.67	109.34	1.62	13.78	12.16	15.15	1.00	8.71	7.71	9.58

Air quality prediction modeling due to plant operation - input & output data

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m³)																	
					PM_{10}					$PM_{2.5}$					SO_2				NO_2			
					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
36	200m ENE	322922.9	2300503	68.7	1.06	4.41	3.35	4.85	307.76	0.61	2.54	1.92	2.79	176.96	1.74	16.00	14.26	17.60	1.38	9.81	8.43	10.79
37	200m E	323004.5	2300178	67.4	0.91	3.42	2.51	3.76	229.82	0.53	1.97	1.44	2.16	132.15	1.16	13.68	12.52	15.05	0.78	8.85	8.07	9.74
38	200m ESE	322802.9	2299902	60.9	1.47	4.46	2.99	4.91	51.83	0.85	2.57	1.72	2.82	29.80	2.01	13.59	11.59	14.95	1.40	6.54	5.13	7.19
39	200m SE	322467.1	2299849	65.2	0.70	4.52	3.82	4.97	4.52	0.40	2.60	2.20	2.86	2.60	0.60	8.69	8.09	9.56	0.38	2.61	2.22	2.87
40	200m SSE	322359.1	2299645	66.6	0.72	2.97	2.25	3.27	2.97	0.42	1.71	1.29	1.88	1.71	1.13	6.50	5.38	7.16	0.59	2.35	1.76	2.58
41	200m S	322138.3	2299380	66.4	0.35	1.89	1.54	2.08	3.50	0.20	1.09	0.89	1.20	2.01	0.61	3.91	3.30	4.30	0.36	1.42	1.06	1.56
42	200m SSW	321857.7	2299500	66.3	0.55	2.14	1.59	2.35	2.93	0.31	1.23	0.92	1.35	1.68	0.93	5.11	4.18	5.62	0.57	2.00	1.43	2.20
43	200m SW	321651.3	2299691	70.5	0.78	5.26	4.47	5.78	9.24	0.45	3.02	2.57	3.32	5.31	1.24	10.24	9.00	11.26	0.73	2.78	2.04	3.05
44	200m WSW	321575.7	2299945	72.1	0.86	5.98	5.13	6.58	26.93	0.49	3.44	2.95	3.78	15.48	1.38	13.24	11.86	14.56	0.78	3.58	2.80	3.94
45	200m W	321599.4	2300178	65.4	1.07	5.80	4.72	6.37	38.03	0.62	3.33	2.71	3.67	21.87	1.63	15.53	13.90	17.08	0.92	3.77	2.85	4.15
46	200m WNW	321693.9	2300362	72.8	1.34	5.91	4.57	6.50	156.48	0.77	3.40	2.63	3.74	89.98	1.98	13.81	11.83	15.20	1.12	4.22	3.10	4.64
47	200m NW	321738.8	2300577	76.2	0.94	5.77	4.83	6.34	188.83	0.54	3.32	2.78	3.65	108.57	1.46	13.21	11.75	14.53	0.76	4.16	3.40	4.58
48	200m NNW	321867.7	2300831	77.6	1.50	3.33	1.83	3.66	200.35	0.86	1.91	1.05	2.10	115.20	2.39	10.92	8.53	12.02	1.37	7.26	5.89	7.98
49	300m N	322138.3	2301013	70.8	0.78	3.25	2.48	3.58	212.96	0.45	1.87	1.42	2.06	122.45	1.21	13.43	12.22	14.77	0.64	7.65	7.01	8.42
50	300m NNE	322431.8	2300886	67.9	0.69	2.99	2.29	3.29	187.83	0.40	1.72	1.32	1.89	108.00	1.12	10.41	9.29	11.45	0.82	6.86	6.04	7.54
51	300m NE	322697.2	2300737	67.1	1.06	4.23	3.17	4.65	214.26	0.61	2.43	1.82	2.67	123.20	1.62	15.42	13.80	16.97	1.08	9.80	8.72	10.78
52	300m ENE	323022.3	2300544	70.3	0.84	4.04	3.20	4.45	282.59	0.48	2.32	1.84	2.56	162.49	1.45	15.85	14.40	17.44	1.10	9.42	8.32	10.36
53	300m E	323104.9	2300178	68.1	0.94	3.26	2.32	3.59	246.71	0.54	1.88	1.34	2.06	141.86	1.24	13.07	11.83	14.38	0.71	8.51	7.80	9.36
54	300m ESE	322930.7	2299850	61.3	1.05	4.43	3.38	4.88	123.39	0.60	2.55	1.94	2.80	70.95	1.56	13.22	11.65	14.54	1.29	6.70	5.40	7.37
55	300m SE	322542	2299774	67.5	0.73	4.48	3.75	4.92	4.48	0.42	2.57	2.16	2.83	2.57	0.85	8.39	7.54	9.23	0.38	2.75	2.36	3.02
56	300m SSE	322407	2299529	70.3	0.54	2.39	1.85	2.63	2.53	0.31	1.38	1.07	1.51	1.46	0.92	5.65	4.74	6.22	0.53	2.16	1.63	2.38
57	300m S	322138.3	2299276	65.7	0.29	1.69	1.40	1.86	21.69	0.17	0.97	0.80	1.07	12.47	0.52	4.04	3.53	4.45	0.31	1.55	1.24	1.71
58	300m SSW	321817	2299402	62.9	0.42	1.82	1.40	2.00	26.04	0.24	1.05	0.81	1.15	14.97	0.71	4.16	3.45	4.58	0.44	1.75	1.31	1.93
59	300m SW	321580.6	2299620	68.3	0.66	4.42	3.76	4.86	41.42	0.38	2.54	2.16	2.80	23.82	1.05	8.72	7.67	9.59	0.63	2.46	1.84	2.71
60	300m WSW	321464.1	2299899	72.9	0.70	5.32	4.62	5.85	114.64	0.40	3.06	2.66	3.36	65.92	1.16	11.75	10.59	12.92	0.66	3.43	2.76	3.77
61	300m W	321484.1	2300178	67.8	0.84	4.95	4.12	5.45	88.09	0.48	2.85	2.37	3.13	50.65	1.34	13.48	12.14	14.83	0.77	3.49	2.71	3.83
62	300m WNW	321597	2300402	73.7	1.07	5.35	4.28	5.89	273.22	0.62	3.08	2.46	3.38	157.10	1.63	14.04	12.41	15.44	0.96	5.31	4.35	5.84
63	300m NW	321659.7	2300656	77.3	0.87	5.37	4.50	5.91	238.38	0.50	3.09	2.59	3.40	137.07	1.43	12.80	11.37	14.08	0.76	4.42	3.66	4.86
64	300m NNW	321828.1	2300927	76.7	1.28	3.12	1.84	3.43	188.10	0.73	1.79	1.06	1.97	108.16	1.91	12.57	10.66	13.83	1.16	7.06	5.90	7.77
65	400m N	322138.3	2301116	70.4	0.63	3.19	2.56	3.51	200.71	0.36	1.84	1.47	2.02	115.41	1.00	13.64	12.64	15.00	0.55	7.60	7.05	8.36
66	400m NNE	322470.5	2300980	70.2	0.53	2.94	2.40	3.23	177.24	0.31	1.69	1.38	1.86	101.91	0.92	11.32	10.40	12.45	0.63	6.92	6.30	7.61
67	400m NE	322770.7	2300810	68.1	0.89	4.21	3.33	4.64	218.16	0.51	2.42	1.91	2.67	125.44	1.43	16.46	15.03	18.11	0.97	10.00	9.03	11.00
68	400m ENE	323118.1	2300584	71.7	0.67	3.56	2.89	3.92	252.30	0.38	2.05	1.66	2.25	145.07	1.19	14.60	13.41	16.06	0.86	8.65	7.80	9.52
69	400m E	323205	2300178	68.6	0.92	3.21	2.29	3.53	244.84	0.53	1.85	1.32	2.03	140.79	1.26	11.68	10.42	12.85	0.78	7.88	7.10	8.67
70	400m ESE	323040.5	2299804	61.4	1.05	4.32	3.27	4.75	155.64	0.60	2.48	1.88	2.73	89.49	1.54	11.80	10.27	12.98	1.03	5.89	4.86	6.48
71	400m SE	322615.8	2299700	67.1	0.85	4.22	3.37	4.64	4.23	0.49	2.42	1.94	2.67	2.43	1.06	8.47	7.41	9.32	0.50	2.84	2.34	3.12

Air quality prediction modeling due to plant operation - input & output data

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m³)																	
					PM_{10}					$PM_{2.5}$					SO_2				NO_2			
					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
72	400m SSE	322453.7	2299416	72.2	0.39	1.97	1.58	2.16	18.05	0.23	1.13	0.91	1.24	10.38	0.69	4.76	4.07	5.23	0.42	3.84	3.41	4.22
73	400m S	322138.3	2299175	67	0.25	1.63	1.38	1.79	62.36	0.14	0.94	0.80	1.03	35.86	0.44	5.04	4.60	5.55	0.27	2.84	2.57	3.12
74	400m SSW	321776.3	2299304	64.9	0.33	1.62	1.29	1.79	92.76	0.19	0.93	0.74	1.03	53.34	0.57	4.14	3.58	4.56	0.35	2.26	1.90	2.48
75	400m SW	321509.8	2299549	64.8	0.55	3.64	3.08	4.00	90.52	0.32	2.09	1.77	2.30	52.05	0.89	7.63	6.75	8.40	0.53	2.91	2.38	3.20
76	400m WSW	321361.8	2299856	73.5	0.58	4.56	3.98	5.01	212.46	0.33	2.62	2.29	2.88	122.16	0.98	10.43	9.45	11.47	0.57	5.25	4.68	5.78
77	400m W	321375.2	2300178	69.5	0.72	4.06	3.34	4.46	124.18	0.41	2.33	1.92	2.57	71.40	1.18	11.39	10.21	12.53	0.68	4.09	3.40	4.50
78	400m WNW	321502.3	2300441	73.4	0.82	4.48	3.66	4.93	323.03	0.47	2.58	2.11	2.84	185.74	1.28	13.78	12.50	15.16	0.79	6.39	5.61	7.03
79	400m NW	321579.4	2300737	76.4	0.75	4.70	3.95	5.17	249.03	0.43	2.70	2.27	2.97	143.19	1.26	12.28	11.02	13.51	0.69	5.03	4.33	5.53
80	400m NNW	321787.1	2301026	78.8	1.14	3.25	2.12	3.58	171.75	0.65	1.87	1.22	2.06	98.76	1.64	13.71	12.08	15.09	0.96	6.75	5.79	7.43
81	500m N	322138.3	2301218	70.9	0.53	3.06	2.53	3.37	196.24	0.30	1.76	1.46	1.94	112.84	0.84	13.18	12.34	14.50	0.48	7.60	7.13	8.36
82	500m NNE	322509	2301073	74.1	0.40	2.80	2.40	3.08	160.31	0.23	1.61	1.38	1.77	92.18	0.71	11.32	10.60	12.45	0.52	6.59	6.07	7.25
83	500m NE	322844.2	2300884	71.6	0.78	4.02	3.24	4.42	208.21	0.45	2.31	1.86	2.54	119.72	1.28	16.55	15.27	18.20	0.78	9.74	8.95	10.71
84	500m ENE	323212.5	2300623	71.8	0.54	3.08	2.54	3.39	232.98	0.31	1.77	1.46	1.95	133.97	0.97	13.04	12.08	14.35	0.68	7.86	7.18	8.65
85	500m E	323305.2	2300178	66.1	0.81	2.99	2.17	3.28	230.87	0.47	1.72	1.25	1.89	132.75	1.15	9.58	8.43	10.54	0.75	7.15	6.40	7.87
86	500m ESE	323143.5	2299761	60.6	1.01	4.16	3.15	4.58	160.20	0.58	2.39	1.81	2.63	92.12	1.51	10.16	8.65	11.17	0.80	4.96	4.16	5.45
87	500m SE	322715.2	2299601	69.9	0.92	3.88	2.97	4.27	49.31	0.53	2.23	1.71	2.46	28.36	1.24	8.84	7.61	9.73	0.58	2.94	2.36	3.23
88	500m SSE	322500.5	2299303	72.9	0.34	1.86	1.53	2.05	73.74	0.19	1.07	0.88	1.18	42.40	0.51	6.69	6.18	7.36	0.33	6.24	5.91	6.86
89	500m S	322138.3	2299074	68.9	0.21	1.59	1.38	1.75	98.63	0.12	0.91	0.79	1.00	56.71	0.38	5.95	5.57	6.55	0.24	3.99	3.75	4.38
90	500m SSW	321735.6	2299206	63.3	0.26	1.41	1.15	1.55	151.44	0.15	0.81	0.66	0.89	87.08	0.45	4.72	4.27	5.19	0.28	3.56	3.28	3.92
91	500m SW	321439	2299479	63.4	0.48	3.10	2.62	3.41	141.06	0.28	1.78	1.51	1.96	81.11	0.77	8.15	7.38	8.96	0.46	4.39	3.93	4.83
92	500m WSW	321263.8	2299816	74	0.49	3.91	3.42	4.30	263.18	0.28	2.25	1.97	2.47	151.33	0.84	10.84	9.99	11.92	0.49	7.29	6.80	8.02
93	500m W	321270.1	2300178	71.1	0.62	3.33	2.72	3.67	150.63	0.36	1.92	1.56	2.11	86.61	1.03	9.78	8.74	10.75	0.60	4.72	4.12	5.19
94	500m WNW	321408.6	2300480	74	0.63	3.83	3.20	4.22	320.38	0.36	2.20	1.84	2.42	184.22	1.01	13.60	12.59	14.96	0.65	7.22	6.57	7.94
95	500m NW	321503.3	2300813	76.8	0.69	4.29	3.60	4.72	280.60	0.40	2.47	2.07	2.71	161.34	1.10	12.40	11.30	13.64	0.62	5.86	5.24	6.45
96	500m NNW	321747.2	2301122	79	0.88	3.07	2.19	3.38	156.00	0.51	1.77	1.26	1.94	89.70	1.35	13.20	11.85	14.52	0.78	6.26	5.48	6.88
97	600m N	322138.3	2301319	71.9	0.46	2.80	2.34	3.08	187.91	0.26	1.61	1.35	1.77	108.05	0.75	12.49	11.74	13.74	0.42	7.30	6.88	8.03
98	600m NNE	322547.4	2301165	76.6	0.30	2.49	2.20	2.74	141.85	0.17	1.43	1.26	1.58	81.56	0.54	10.08	9.54	11.09	0.41	5.84	5.42	6.42
99	600m NE	322923.6	2300963	73.3	0.67	3.55	2.88	3.91	190.54	0.38	2.04	1.66	2.25	109.56	1.13	14.86	13.72	16.34	0.68	8.77	8.09	9.65
100	600m ENE	323306.3	2300662	72.2	0.44	2.68	2.23	2.94	213.20	0.25	1.54	1.28	1.69	122.59	0.81	11.65	10.85	12.82	0.55	7.20	6.65	7.92
101	600m E	323405.2	2300178	66.7	0.76	2.92	2.16	3.22	213.82	0.44	1.68	1.24	1.85	122.95	1.10	7.93	6.83	8.72	0.75	6.51	5.76	7.16
102	600m ESE	323242.8	2299720	64.4	1.02	4.23	3.21	4.65	152.87	0.59	2.43	1.84	2.68	87.90	1.54	10.53	8.99	11.58	0.84	4.35	3.52	4.79
103	600m SE	322816.1	2299500	71.2	0.88	3.52	2.64	3.87	144.26	0.50	2.02	1.52	2.22	82.95	1.26	8.93	7.68	9.83	0.61	4.21	3.60	4.63
104	600m SSE	322545.6	2299195	74.2	0.30	1.77	1.46	1.94	121.71	0.17	1.02	0.84	1.12	69.98	0.47	7.27	6.80	8.00	0.27	6.91	6.64	7.60
105	600m S	322138.3	2298973	71.3	0.18	1.51	1.33	1.66	116.16	0.10	0.87	0.77	0.96	66.79	0.32	6.31	5.99	6.94	0.21	4.54	4.33	4.99
106	600m SSW	321695.2	2299108	65.2	0.22	1.27	1.06	1.40	178.61	0.12	0.73	0.61	0.80	102.70	0.37	5.33	4.97	5.87	0.23	4.35	4.12	4.78
107	600m SW	321368.3	2299408	66.8	0.45	2.83	2.38	3.11	180.54	0.26	1.63	1.37	1.79	103.81	0.71	9.35	8.65	10.29	0.42	6.05	5.63	6.65

Air quality prediction modeling due to plant operation - input & output data

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m³)																	
					PM_{10}					$PM_{2.5}$					SO_2				NO_2			
					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
108	600m WSW	321167.8	2299776	73.9	0.42	3.38	2.97	3.72	274.47	0.24	1.95	1.71	2.14	157.82	0.73	11.86	11.13	13.04	0.42	8.75	8.33	9.63
109	600m W	321166.9	2300178	72.6	0.54	3.03	2.48	3.33	153.17	0.31	1.74	1.43	1.91	88.07	0.93	8.55	7.63	9.41	0.54	5.23	4.69	5.76
110	600m WNW	321313.9	2300519	70.9	0.47	3.22	2.75	3.54	285.32	0.27	1.85	1.58	2.03	164.06	0.77	12.63	11.86	13.90	0.50	8.33	7.83	9.17
111	600m NW	321427.4	2300889	77.8	0.63	4.00	3.38	4.40	288.22	0.36	2.30	1.94	2.53	165.73	0.95	11.96	11.01	13.16	0.54	6.15	5.60	6.76
112	600m NNW	321707.8	2301217	77.8	0.64	2.72	2.08	3.00	142.70	0.37	1.57	1.20	1.72	82.05	1.02	11.82	10.80	13.01	0.65	5.68	5.03	6.25
113	800m N	322138.3	2301521	76.5	0.37	2.46	2.08	2.71	170.05	0.22	1.41	1.20	1.56	97.78	0.64	10.06	9.42	11.07	0.35	6.29	5.94	6.92
114	800m NNE	322624.1	2301351	78.5	0.24	2.04	1.80	2.25	111.54	0.14	1.17	1.03	1.29	64.14	0.33	7.40	7.07	8.14	0.26	4.26	4.00	4.68
115	800m NE	323078.9	2301118	75.8	0.60	2.94	2.34	3.23	159.61	0.34	1.69	1.35	1.86	91.78	0.87	11.59	10.72	12.75	0.52	7.05	6.53	7.75
116	800m ENE	323492.7	2300739	72.6	0.32	2.10	1.79	2.32	179.20	0.18	1.21	1.03	1.33	103.04	0.58	9.61	9.03	10.57	0.39	6.28	5.89	6.91
117	800m E	323605.3	2300178	67.2	0.65	2.78	2.13	3.05	181.32	0.37	1.60	1.22	1.76	104.26	0.97	7.99	7.02	8.79	0.68	5.51	4.83	6.06
118	800m ESE	323435.9	2299640	61.4	0.92	3.90	2.98	4.29	123.88	0.53	2.24	1.71	2.46	71.23	1.39	10.76	9.38	11.84	0.78	4.75	3.97	5.23
119	800m SE	322985.9	2299330	74.3	0.76	3.11	2.35	3.43	191.38	0.44	1.79	1.35	1.97	110.04	1.13	8.65	7.51	9.51	0.60	6.17	5.57	6.79
120	800m SSE	322629.8	2298991	76	0.25	1.60	1.35	1.76	124.58	0.14	0.92	0.78	1.01	71.63	0.37	5.83	5.45	6.41	0.25	5.57	5.32	6.12
121	800m S	322138.3	2298772	73.9	0.15	1.29	1.14	1.42	111.67	0.09	0.74	0.66	0.82	64.21	0.28	5.96	5.68	6.55	0.19	4.48	4.29	4.93
122	800m SSW	321616	2298917	67.3	0.15	1.06	0.91	1.17	159.12	0.09	0.61	0.52	0.67	91.49	0.26	5.25	5.00	5.78	0.16	4.30	4.14	4.73
123	800m SW	321226.7	2299266	68.3	0.38	2.38	1.99	2.61	188.02	0.22	1.37	1.15	1.50	108.11	0.59	9.81	9.22	10.79	0.35	7.20	6.86	7.92
124	800m WSW	320978.7	2299697	74.5	0.31	2.68	2.36	2.94	244.70	0.18	1.54	1.36	1.69	140.70	0.55	11.51	10.96	12.66	0.33	9.06	8.73	9.96
125	800m W	320962.8	2300178	74.8	0.44	2.58	2.14	2.84	156.54	0.25	1.48	1.23	1.63	90.01	0.75	7.21	6.45	7.93	0.44	5.47	5.03	6.02
126	800m WNW	321128.5	2300596	73.9	0.30	2.33	2.03	2.56	236.13	0.17	1.34	1.16	1.47	135.77	0.50	10.77	10.26	11.84	0.34	9.04	8.69	9.94
127	800m NW	321276.6	2301039	79.4	0.52	3.56	3.04	3.92	271.16	0.30	2.05	1.75	2.25	155.92	0.75	11.13	10.38	12.25	0.41	5.95	5.54	6.55
128	800m NNW	321629.8	2301405	77.1	0.38	2.03	1.65	2.23	123.73	0.22	1.17	0.95	1.28	71.14	0.62	8.89	8.27	9.78	0.49	4.77	4.28	5.25
129	1 km N	322138.3	2301722	79.5	0.31	2.13	1.82	2.34	155.29	0.18	1.22	1.05	1.35	89.29	0.54	9.14	8.60	10.06	0.33	5.50	5.17	6.05
130	1 km NNE	322700.8	2301536	74.3	0.21	1.70	1.49	1.87	94.80	0.12	0.98	0.86	1.07	54.51	0.28	5.71	5.43	6.28	0.17	3.48	3.31	3.83
131	1 km NE	323228.3	2301268	75.6	0.53	2.42	1.89	2.67	155.17	0.31	1.39	1.09	1.53	89.23	0.67	10.22	9.55	11.25	0.41	6.49	6.08	7.14
132	1 km ENE	323678.5	2300816	70.4	0.24	1.75	1.51	1.93	154.56	0.14	1.01	0.87	1.11	88.87	0.44	8.30	7.85	9.12	0.29	5.66	5.38	6.23
133	1 km E	323805.4	2300178	63.4	0.52	2.48	1.96	2.73	157.08	0.30	1.43	1.13	1.57	90.32	0.79	7.78	6.99	8.56	0.55	5.21	4.66	5.74
134	1 km ESE	323625.5	2299562	62.5	0.86	3.76	2.90	4.14	133.41	0.50	2.16	1.66	2.38	76.71	1.32	11.25	9.93	12.37	0.75	5.57	4.82	6.12
135	1 km SE	323142.8	2299173	71.1	0.65	2.84	2.20	3.13	175.70	0.37	1.64	1.26	1.80	101.03	0.95	9.40	8.45	10.34	0.53	5.74	5.21	6.31
136	1 km SSE	322710.6	2298796	74.2	0.20	1.44	1.24	1.58	107.28	0.12	0.83	0.71	0.91	61.69	0.30	4.34	4.04	4.77	0.23	4.00	3.77	4.40
137	1 km S	322138.3	2298572	76	0.15	1.11	0.96	1.22	93.98	0.09	0.64	0.55	0.70	54.04	0.25	5.31	5.06	5.84	0.18	4.04	3.86	4.44
138	1 km SSW	321537.9	2298728	68	0.12	0.91	0.80	1.01	118.85	0.07	0.53	0.46	0.58	68.34	0.20	4.34	4.14	4.77	0.12	3.57	3.45	3.93
139	1 km SW	321085.2	2299125	70.1	0.36	2.25	1.89	2.47	158.13	0.21	1.29	1.09	1.42	90.93	0.53	8.53	7.99	9.38	0.30	6.37	6.06	7.00
140	1 km WSW	320791.3	2299620	71.1	0.24	2.20	1.95	2.41	203.31	0.14	1.26	1.12	1.39	116.91	0.43	9.72	9.29	10.69	0.25	7.72	7.47	8.49
141	1 km W	320760.5	2300178	78.3	0.38	2.28	1.90	2.51	150.31	0.22	1.31	1.09	1.44	86.43	0.65	7.23	6.58	7.95	0.39	4.92	4.53	5.41
142	1 km WNW	320939.1	2300675	76.4	0.21	1.93	1.72	2.12	214.98	0.12	1.11	0.99	1.22	123.62	0.34	9.21	8.86	10.13	0.23	7.95	7.72	8.75
143	1 km NW	321129.8	2301186	81.1	0.44	3.25	2.81	3.57	249.18	0.25	1.87	1.61	2.05	143.28	0.70	11.32	10.63	12.46	0.38	6.72	6.34	7.39

Air quality prediction modeling due to plant operation - input & output data

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m³)																	
					PM_{10}					$PM_{2.5}$					SO_2				NO_2			
					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
144	1 km NNW	321552.5	2301592	76.8	0.27	1.48	1.21	1.63	110.94	0.15	0.85	0.70	0.94	63.79	0.43	6.52	6.09	7.17	0.41	4.17	3.77	4.59
145	1.2 km N	322138.3	2301923	74.8	0.25	1.83	1.58	2.02	143.37	0.15	1.05	0.91	1.16	82.44	0.45	8.16	7.72	8.98	0.28	4.99	4.71	5.49
146	1.2 km NNE	322777.6	2301721	69.2	0.17	1.41	1.24	1.55	85.74	0.10	0.81	0.71	0.89	49.30	0.25	4.92	4.68	5.41	0.15	3.11	2.96	3.42
147	1.2 km NE	323374.8	2301414	74	0.47	2.05	1.59	2.26	155.32	0.27	1.18	0.91	1.30	89.31	0.58	8.99	8.41	9.89	0.33	6.00	5.66	6.60
148	1.2 km ENE	323863.9	2300893	69.2	0.20	1.53	1.33	1.68	137.48	0.11	0.88	0.77	0.97	79.05	0.36	7.45	7.08	8.19	0.23	5.23	5.00	5.75
149	1.2 km E	324005.4	2300178	64.4	0.45	2.41	1.96	2.65	139.50	0.26	1.38	1.12	1.52	80.21	0.70	7.91	7.21	8.70	0.49	5.27	4.79	5.80
150	1.2 km ESE	323813.5	2299484	64.1	0.82	3.63	2.81	3.99	157.21	0.47	2.09	1.62	2.30	90.39	1.27	11.49	10.22	12.64	0.73	6.08	5.35	6.69
151	1.2 km SE	323293.9	2299022	66.2	0.54	2.62	2.08	2.88	206.36	0.31	1.51	1.19	1.66	118.66	0.79	9.76	8.97	10.74	0.45	6.36	5.91	7.00
152	1.2 km SSE	322790	2298604	76.9	0.19	1.34	1.15	1.47	92.49	0.11	0.77	0.66	0.84	53.18	0.25	4.30	4.05	4.73	0.24	4.02	3.79	4.43
153	1.2 km S	322138.3	2298372	77	0.16	0.98	0.82	1.07	85.84	0.09	0.56	0.47	0.62	49.36	0.23	4.83	4.61	5.32	0.16	3.71	3.55	4.08
154	1.2 km SSW	321460.4	2298541	68.5	0.10	0.80	0.70	0.88	93.51	0.06	0.46	0.40	0.51	53.77	0.16	3.70	3.54	4.07	0.10	2.82	2.72	3.11
155	1.2 km SW	320943.6	2298983	69.3	0.32	2.11	1.79	2.32	164.10	0.19	1.21	1.03	1.34	94.36	0.47	7.85	7.38	8.63	0.27	5.69	5.42	6.25
156	1.2 km WSW	320604.8	2299543	70.8	0.21	1.88	1.67	2.07	177.36	0.12	1.08	0.96	1.19	101.98	0.35	8.25	7.91	9.08	0.21	6.55	6.34	7.20
157	1.2 km W	320558.9	2300178	79.3	0.34	2.00	1.66	2.20	169.36	0.20	1.15	0.95	1.26	97.38	0.57	7.54	6.97	8.29	0.35	5.30	4.95	5.83
158	1.2 km WNW	320750.8	2300752	75.1	0.18	1.56	1.38	1.72	187.17	0.10	0.90	0.79	0.99	107.62	0.26	7.65	7.39	8.41	0.16	6.66	6.50	7.33
159	1.2 km NW	320984.8	2301331	80.1	0.42	2.98	2.56	3.28	231.47	0.24	1.71	1.47	1.88	133.10	0.66	11.24	10.57	12.36	0.35	7.10	6.75	7.81
160	1.2 km NNW	321475.4	2301778	74.8	0.20	1.09	0.89	1.20	100.92	0.11	0.63	0.51	0.69	58.03	0.31	4.81	4.50	5.29	0.30	3.75	3.44	4.12
161	1.4 km N	322138.3	2302123	70	0.22	1.60	1.38	1.76	133.31	0.12	0.92	0.79	1.01	76.65	0.38	7.31	6.93	8.04	0.24	4.61	4.37	5.07
162	1.4 km NNE	322854.3	2301906	73.5	0.18	1.29	1.11	1.42	78.35	0.10	0.74	0.64	0.81	45.05	0.22	4.40	4.18	4.85	0.14	2.83	2.69	3.11
163	1.4 km NE	323519.8	2301559	73	0.42	1.86	1.44	2.04	151.67	0.24	1.07	0.83	1.18	87.21	0.54	7.95	7.41	8.74	0.32	5.54	5.23	6.10
164	1.4 km ENE	324049.1	2300969	69.7	0.17	1.38	1.21	1.52	134.06	0.10	0.79	0.70	0.87	77.08	0.31	6.85	6.54	7.54	0.20	4.89	4.70	5.38
165	1.4 km E	324205.4	2300178	62.2	0.38	2.23	1.85	2.45	125.69	0.22	1.28	1.06	1.41	72.27	0.59	7.64	7.04	8.40	0.41	5.06	4.65	5.57
166	1.4 km ESE	324000.5	2299406	62.2	0.74	3.39	2.64	3.72	165.41	0.43	1.95	1.52	2.14	95.11	1.16	11.15	9.99	12.26	0.67	6.19	5.51	6.81
167	1.4 km SE	323442	2298874	64.8	0.48	2.44	1.96	2.68	224.65	0.27	1.40	1.13	1.54	129.18	0.69	9.88	9.19	10.86	0.40	6.86	6.46	7.55
168	1.4 km SSE	322868.5	2298415	76.5	0.18	1.22	1.04	1.35	82.91	0.11	0.70	0.60	0.77	47.67	0.24	3.90	3.66	4.29	0.21	3.67	3.46	4.04
169	1.4 km S	322138.3	2298172	84.8	0.22	0.90	0.67	0.99	77.54	0.13	0.52	0.39	0.57	44.59	0.26	4.60	4.34	5.06	0.17	3.59	3.42	3.95
170	1.4 km SSW	321383.1	2298355	67.8	0.09	0.71	0.62	0.78	80.95	0.05	0.41	0.36	0.45	46.55	0.14	3.41	3.28	3.76	0.09	2.64	2.56	2.91
171	1.4 km SW	320802.1	2298842	63.1	0.25	1.80	1.54	1.98	161.35	0.15	1.03	0.89	1.14	92.78	0.38	7.15	6.78	7.87	0.22	5.38	5.16	5.91
172	1.4 km WSW	320418.8	2299466	76	0.23	1.67	1.43	1.83	164.31	0.13	0.96	0.82	1.05	94.48	0.33	7.43	7.11	8.18	0.22	5.91	5.69	6.50
173	1.4 km W	320357.8	2300178	80.9	0.34	1.77	1.43	1.95	174.66	0.19	1.02	0.82	1.12	100.43	0.53	7.52	6.99	8.27	0.33	5.61	5.28	6.17
174	1.4 km WNW	320563.3	2300830	79.2	0.22	1.30	1.09	1.43	163.23	0.12	0.75	0.62	0.82	93.86	0.27	6.76	6.49	7.44	0.17	5.67	5.50	6.23
175	1.4 km NW	320840.9	2301475	80.3	0.40	2.76	2.37	3.04	216.73	0.23	1.59	1.36	1.75	124.62	0.63	11.02	10.39	12.12	0.35	7.25	6.90	7.98
176	1.4 km NNW	321398.5	2301964	68.9	0.15	0.87	0.72	0.96	92.22	0.09	0.50	0.42	0.55	53.03	0.23	4.30	4.07	4.73	0.20	3.39	3.20	3.73
177	1.6 km N	322138.3	2302323	70.3	0.20	1.41	1.21	1.56	125.12	0.11	0.81	0.70	0.89	71.94	0.32	6.64	6.32	7.30	0.22	4.31	4.09	4.74
178	1.6 km NNE	322931	2302092	70.8	0.16	1.11	0.96	1.22	72.19	0.09	0.64	0.55	0.70	41.51	0.21	4.02	3.81	4.42	0.13	2.61	2.48	2.88
179	1.6 km NE	323663.9	2301703	73.9	0.39	1.77	1.37	1.94	146.22	0.23	1.01	0.79	1.12	84.08	0.52	7.43	6.90	8.17	0.32	5.14	4.82	5.65

Air quality prediction modeling due to plant operation - input & output data

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m³)																	
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					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
180	1.6 km ENE	324234.3	2301046	67.5	0.15	1.26	1.11	1.39	128.48	0.09	0.73	0.64	0.80	73.88	0.28	6.35	6.07	6.98	0.17	4.57	4.40	5.03
181	1.6 km E	324405.5	2300178	63.5	0.34	2.18	1.84	2.40	121.35	0.20	1.25	1.06	1.38	69.78	0.54	7.58	7.04	8.34	0.37	4.93	4.56	5.42
182	1.6 km ESE	324187	2299329	65.9	0.72	3.31	2.59	3.64	169.84	0.41	1.90	1.49	2.09	97.66	1.14	11.17	10.03	12.28	0.67	6.32	5.65	6.95
183	1.6 km SE	323588.4	2298728	68.8	0.47	2.31	1.84	2.54	233.43	0.27	1.33	1.06	1.46	134.22	0.66	9.88	9.22	10.86	0.37	7.13	6.76	7.84
184	1.6 km SSE	322946.5	2298227	73.1	0.17	1.11	0.94	1.22	76.20	0.10	0.64	0.54	0.70	43.81	0.23	3.37	3.15	3.71	0.17	3.19	3.01	3.51
185	1.6 km S	322138.3	2297971	93.9	0.46	1.33	0.87	1.47	72.72	0.27	0.77	0.50	0.84	41.81	0.52	4.43	3.91	4.87	0.24	3.51	3.26	3.86
186	1.6 km SSW	321306.1	2298169	69.4	0.11	0.63	0.51	0.69	79.27	0.06	0.36	0.30	0.40	45.58	0.12	3.20	3.08	3.52	0.07	2.51	2.44	2.76
187	1.6 km SW	320660.7	2298700	67.6	0.27	1.87	1.59	2.05	161.24	0.16	1.07	0.92	1.18	92.71	0.39	7.23	6.83	7.95	0.22	5.37	5.15	5.91
188	1.6 km WSW	320233.1	2299389	73	0.20	1.45	1.25	1.60	151.92	0.12	0.83	0.72	0.92	87.35	0.28	6.79	6.51	7.47	0.19	5.32	5.13	5.85
189	1.6 km W	320156.9	2300178	82.6	0.37	1.63	1.26	1.79	170.77	0.21	0.94	0.72	1.03	98.20	0.52	7.23	6.72	7.96	0.33	5.59	5.27	6.15
190	1.6 km WNW	320376.6	2300908	83	0.28	1.08	0.80	1.19	143.49	0.16	0.62	0.46	0.68	82.51	0.34	5.95	5.61	6.54	0.20	4.91	4.71	5.40
191	1.6 km NW	320697.6	2301618	78.2	0.38	2.54	2.16	2.79	203.66	0.22	1.46	1.24	1.60	117.10	0.58	10.55	9.97	11.61	0.33	7.13	6.80	7.84
192	1.6 km NNW	321321.7	2302149	66.8	0.13	0.78	0.65	0.86	84.95	0.07	0.45	0.37	0.49	48.85	0.18	3.92	3.74	4.31	0.14	3.10	2.97	3.41
193	1.8 km N	322138.3	2302524	68	0.18	1.25	1.07	1.38	117.81	0.11	0.72	0.61	0.79	67.74	0.28	6.00	5.72	6.60	0.20	3.99	3.80	4.39
194	1.8 km NNE	323007.7	2302277	67.3	0.13	0.96	0.83	1.06	66.97	0.08	0.55	0.48	0.61	38.51	0.19	3.71	3.52	4.08	0.13	2.43	2.30	2.67
195	1.8 km NE	323807.4	2301847	72	0.35	1.61	1.25	1.77	138.30	0.20	0.92	0.72	1.02	79.52	0.49	6.87	6.38	7.56	0.31	4.75	4.44	5.23
196	1.8 km ENE	324419.3	2301123	64.4	0.13	1.16	1.03	1.28	122.10	0.08	0.67	0.59	0.73	70.21	0.25	5.89	5.65	6.48	0.15	4.28	4.12	4.70
197	1.8 km E	324605.5	2300178	59	0.29	1.96	1.67	2.15	113.81	0.17	1.12	0.96	1.24	65.44	0.45	7.01	6.55	7.71	0.31	4.55	4.25	5.01
198	1.8 km ESE	324373.1	2299252	70.2	0.70	3.24	2.54	3.56	168.26	0.40	1.86	1.46	2.05	96.75	1.12	11.10	9.98	12.21	0.67	6.33	5.66	6.96
199	1.8 km SE	323733.6	2298582	68.5	0.43	2.15	1.72	2.36	226.79	0.24	1.24	0.99	1.36	130.41	0.59	9.52	8.93	10.47	0.34	7.02	6.68	7.72
200	1.8 km SSE	323024.2	2298039	70.7	0.16	1.02	0.86	1.12	70.93	0.09	0.58	0.50	0.64	40.79	0.22	2.89	2.67	3.18	0.15	2.73	2.58	3.01
201	1.8 km S	322138.3	2297771	91.6	0.41	1.07	0.66	1.17	68.44	0.23	0.61	0.38	0.68	39.36	0.47	4.18	3.71	4.60	0.20	3.34	3.14	3.67
202	1.8 km SSW	321229.1	2297983	72.2	0.17	0.57	0.40	0.63	75.53	0.10	0.33	0.23	0.36	43.43	0.18	3.00	2.81	3.30	0.09	2.38	2.29	2.62
203	1.8 km SW	320519.2	2298559	70	0.28	1.89	1.61	2.08	153.51	0.16	1.09	0.92	1.20	88.27	0.40	7.07	6.67	7.78	0.23	5.16	4.93	5.68
204	1.8 km WSW	320047.6	2299312	73.2	0.20	1.30	1.10	1.43	141.37	0.11	0.75	0.64	0.82	81.29	0.27	6.29	6.01	6.91	0.19	4.92	4.74	5.42
205	1.8 km W	319956.3	2300178	83.1	0.36	1.52	1.16	1.67	161.13	0.21	0.87	0.66	0.96	92.65	0.49	6.77	6.28	7.45	0.33	5.35	5.02	5.88
206	1.8 km WNW	320190.2	2300985	84.5	0.32	0.99	0.67	1.09	127.10	0.18	0.57	0.39	0.62	73.08	0.38	5.11	4.73	5.62	0.21	4.31	4.09	4.74
207	1.8 km NW	320554.8	2301761	73.4	0.33	2.29	1.97	2.52	191.89	0.19	1.32	1.13	1.45	110.34	0.51	9.89	9.38	10.88	0.29	6.83	6.54	7.51
208	1.8 km NNW	321244.9	2302335	66.4	0.15	0.71	0.56	0.78	78.67	0.08	0.41	0.32	0.45	45.23	0.20	3.60	3.41	3.96	0.11	2.85	2.74	3.14
209	2 km N	322138.3	2302724	61.3	0.16	1.11	0.94	1.22	110.21	0.09	0.64	0.54	0.70	63.37	0.25	5.39	5.14	5.93	0.18	3.67	3.48	4.03
210	2 km NNE	323084.3	2302462	62.4	0.12	0.84	0.72	0.92	62.47	0.07	0.48	0.41	0.53	35.92	0.18	3.44	3.26	3.79	0.12	2.27	2.15	2.50
211	2 km NE	323950.5	2301990	67.9	0.31	1.42	1.11	1.56	129.46	0.18	0.82	0.64	0.90	74.44	0.42	6.29	5.87	6.92	0.26	4.43	4.17	4.87
212	2 km ENE	324604.3	2301199	58.4	0.12	1.07	0.95	1.18	115.23	0.07	0.62	0.55	0.68	66.26	0.22	5.48	5.26	6.03	0.14	3.99	3.85	4.39
213	2 km E	324805.5	2300178	64	0.29	2.00	1.70	2.20	108.94	0.17	1.15	0.98	1.26	62.64	0.44	7.08	6.64	7.79	0.29	4.47	4.17	4.91
214	2 km ESE	324558.9	2299175	67.4	0.63	3.00	2.37	3.30	159.37	0.36	1.72	1.36	1.90	91.64	1.01	10.43	9.42	11.47	0.61	6.03	5.42	6.63
215	2 km SE	323878.2	2298438	72.9	0.44	2.05	1.61	2.26	218.31	0.25	1.18	0.93	1.30	125.53	0.60	9.21	8.61	10.13	0.34	6.84	6.50	7.52

Air quality prediction modeling due to plant operation - input & output data

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m³)																	
					PM_{10}					$PM_{2.5}$					SO_2				NO_2			
					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
216	2 km SSE	323101.6	2297852	71.7	0.16	0.95	0.79	1.04	66.40	0.09	0.54	0.45	0.60	38.18	0.23	2.53	2.31	2.79	0.16	2.36	2.20	2.59
217	2 km S	322138.3	2297571	81.4	0.21	0.72	0.51	0.79	63.36	0.12	0.41	0.29	0.45	36.43	0.24	3.90	3.66	4.30	0.12	3.13	3.01	3.44
218	2 km SSW	321152.2	2297797	74.4	0.22	0.52	0.31	0.57	70.56	0.12	0.30	0.18	0.33	40.57	0.25	2.79	2.54	3.07	0.11	2.23	2.12	2.46
219	2 km SW	320377.7	2298417	73.1	0.31	1.98	1.67	2.17	143.52	0.18	1.14	0.96	1.25	82.52	0.44	7.00	6.56	7.70	0.25	4.94	4.69	5.43
220	2 km WSW	319862.2	2299235	72.9	0.20	1.21	1.01	1.33	131.12	0.11	0.70	0.58	0.77	75.39	0.26	5.76	5.50	6.34	0.18	4.55	4.37	5.01
221	2 km W	319755.7	2300178	83.5	0.35	1.43	1.08	1.57	149.48	0.20	0.82	0.62	0.90	85.95	0.48	6.26	5.78	6.89	0.33	5.01	4.68	5.51
222	2 km WNW	320004.2	2301062	86.5	0.36	0.98	0.62	1.08	113.42	0.20	0.56	0.36	0.62	65.22	0.43	4.37	3.94	4.80	0.25	3.78	3.53	4.16
223	2 km NW	320412.2	2301904	72.4	0.32	2.12	1.80	2.33	181.29	0.19	1.22	1.03	1.34	104.24	0.49	9.35	8.86	10.28	0.28	6.54	6.26	7.19
224	2 km NNW	321168.2	2302520	67.2	0.17	0.65	0.47	0.71	73.16	0.10	0.37	0.27	0.41	42.07	0.23	3.33	3.10	3.66	0.10	2.64	2.53	2.90
225	2.5 km N	322138.3	2303224	63	0.15	0.97	0.82	1.07	96.38	0.09	0.56	0.47	0.61	55.42	0.22	4.33	4.11	4.77	0.16	3.12	2.96	3.44
226	2.5 km NNE	323275.8	2302924	61	0.11	0.69	0.58	0.75	53.55	0.06	0.39	0.33	0.43	30.79	0.15	2.92	2.76	3.21	0.11	1.95	1.84	2.14
227	2.5 km NE	324307	2302346	61	0.25	1.13	0.88	1.24	109.43	0.14	0.65	0.51	0.72	62.92	0.33	5.24	4.90	5.76	0.21	3.80	3.59	4.18
228	2.5 km ENE	325066.6	2301391	59.1	0.10	0.90	0.80	0.99	100.82	0.06	0.52	0.46	0.57	57.97	0.18	4.66	4.48	5.13	0.11	3.43	3.32	3.77
229	2.5 km E	325305.5	2300178	68.1	0.28	1.84	1.56	2.02	92.40	0.16	1.06	0.90	1.16	53.13	0.40	6.45	6.05	7.09	0.27	3.92	3.65	4.32
230	2.5 km ESE	325022.7	2298983	75.9	0.56	2.78	2.21	3.05	141.03	0.32	1.60	1.27	1.76	81.09	0.93	9.82	8.89	10.80	0.57	5.62	5.05	6.18
231	2.5 km SE	324237.9	2298078	91.1	0.89	2.23	1.34	2.46	188.60	0.51	1.28	0.77	1.41	108.44	1.22	8.94	7.72	9.83	0.74	6.14	5.40	6.75
232	2.5 km SSE	323294.5	2297386	77.6	0.18	0.80	0.62	0.88	57.24	0.11	0.46	0.36	0.51	32.91	0.26	2.22	1.95	2.44	0.21	1.71	1.50	1.88
233	2.5 km S	322138.3	2297071	77.7	0.17	0.60	0.44	0.66	53.98	0.10	0.35	0.25	0.38	31.04	0.21	3.35	3.14	3.68	0.11	2.70	2.59	2.97
234	2.5 km SSW	320960.3	2297334	80.3	0.36	0.83	0.48	0.92	57.71	0.20	0.48	0.28	0.53	33.18	0.45	2.32	1.88	2.56	0.22	1.87	1.66	2.06
235	2.5 km SW	320024.1	2298064	69.5	0.25	1.62	1.37	1.78	113.37	0.15	0.93	0.79	1.02	65.19	0.36	5.68	5.32	6.25	0.22	3.96	3.74	4.35
236	2.5 km WSW	319399.3	2299043	69.2	0.17	0.99	0.83	1.09	108.07	0.10	0.57	0.48	0.63	62.14	0.22	4.62	4.41	5.09	0.16	3.72	3.56	4.09
237	2.5 km W	319254.8	2300178	79.6	0.25	1.15	0.90	1.27	119.11	0.14	0.66	0.52	0.73	68.49	0.37	4.96	4.59	5.46	0.25	4.03	3.78	4.44
238	2.5 km WNW	319540	2301254	78.6	0.22	0.68	0.46	0.75	87.84	0.13	0.39	0.27	0.43	50.51	0.27	3.29	3.02	3.62	0.19	2.85	2.67	3.14
239	2.5 km NW	320056.6	2302259	67.4	0.28	1.79	1.51	1.97	159.03	0.16	1.03	0.87	1.13	91.44	0.44	7.93	7.49	8.72	0.25	5.67	5.42	6.24
240	2.5 km NNW	320976.5	2302983	63.7	0.17	0.53	0.36	0.58	61.82	0.10	0.30	0.20	0.33	35.55	0.23	2.78	2.54	3.05	0.11	2.20	2.09	2.42
241	3 km N	322138.3	2303724	65.9	0.15	0.95	0.79	1.04	85.73	0.09	0.55	0.46	0.60	49.29	0.22	3.78	3.56	4.16	0.15	2.79	2.64	3.07
242	3 km NNE	323467.3	2303386	61.2	0.09	0.59	0.50	0.65	46.91	0.05	0.34	0.29	0.38	26.97	0.13	2.53	2.40	2.78	0.09	1.70	1.61	1.87
243	3 km NE	324662.5	2302702	56.2	0.21	0.95	0.74	1.04	92.72	0.12	0.54	0.43	0.60	53.32	0.28	4.48	4.20	4.93	0.18	3.31	3.13	3.64
244	3 km ENE	325528.8	2301582	56.3	0.08	0.77	0.69	0.85	88.16	0.05	0.44	0.40	0.49	50.69	0.15	4.02	3.87	4.42	0.09	2.97	2.88	3.27
245	3 km E	325805.5	2300178	70	0.26	1.62	1.36	1.78	77.63	0.15	0.93	0.78	1.03	44.64	0.38	5.63	5.24	6.19	0.26	3.37	3.11	3.71
246	3 km ESE	325485.9	2298791	81.6	0.49	2.52	2.04	2.78	123.29	0.28	1.45	1.17	1.60	70.89	0.82	9.05	8.23	9.96	0.51	5.13	4.62	5.64
247	3 km SE	324595.7	2297720	92.1	0.75	2.10	1.35	2.31	153.14	0.43	1.21	0.78	1.33	88.05	1.08	7.91	6.84	8.70	0.77	5.23	4.46	5.75
248	3 km SSE	323487	2296922	90.9	0.35	1.47	1.12	1.62	50.31	0.20	0.84	0.64	0.93	28.93	0.45	3.31	2.86	3.64	0.34	1.71	1.37	1.88
249	3 km S	322138.3	2296571	89.2	0.30	0.83	0.53	0.91	46.65	0.17	0.48	0.31	0.53	26.83	0.40	2.90	2.50	3.19	0.22	2.34	2.12	2.58
250	3 km SSW	320768.5	2296871	81.7	0.39	1.00	0.61	1.10	47.13	0.22	0.57	0.35	0.63	27.10	0.52	1.98	1.47	2.18	0.28	1.57	1.30	1.73
251	3 km SW	319670.5	2297710	70.5	0.25	1.52	1.28	1.68	90.82	0.14	0.88	0.73	0.96	52.22	0.36	5.04	4.69	5.55	0.22	3.35	3.13	3.68

Air quality prediction modeling due to plant operation - input & output data

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m³)																	
					PM_{10}					$PM_{2.5}$					SO_2				NO_2			
					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
252	3 km WSW	318936.7	2298852	77.6	0.24	1.04	0.80	1.14	90.86	0.14	0.60	0.46	0.66	52.24	0.32	4.21	3.89	4.63	0.23	3.28	3.04	3.60
253	3 km W	318754.2	2300178	87.7	0.31	1.18	0.87	1.29	96.91	0.18	0.68	0.50	0.74	55.72	0.46	4.71	4.24	5.18	0.32	3.31	2.99	3.64
254	3 km WNW	319077	2301447	81.9	0.23	0.65	0.41	0.71	70.52	0.13	0.37	0.24	0.41	40.55	0.30	2.60	2.31	2.86	0.22	2.24	2.02	2.47
255	3 km NW	319701.7	2302614	67.4	0.27	1.68	1.41	1.85	141.50	0.16	0.97	0.81	1.07	81.36	0.44	6.80	6.36	7.48	0.26	4.92	4.66	5.41
256	3 km NNW	320785	2303445	63.5	0.18	0.51	0.33	0.56	53.36	0.10	0.29	0.19	0.32	30.68	0.25	2.37	2.12	2.61	0.13	1.87	1.74	2.06
257	4 km N	322138.3	2304725	61.5	0.13	0.79	0.66	0.87	70.32	0.08	0.46	0.38	0.50	40.43	0.19	3.14	2.94	3.45	0.13	2.30	2.17	2.53
258	4 km NNE	323850.1	2304311	58.4	0.08	0.51	0.44	0.56	37.67	0.04	0.30	0.25	0.32	21.66	0.11	2.00	1.89	2.20	0.08	1.36	1.28	1.50
259	4 km NE	325372.1	2303412	52.6	0.16	0.75	0.59	0.82	71.19	0.09	0.43	0.34	0.47	40.94	0.24	3.51	3.27	3.86	0.16	2.63	2.47	2.89
260	4 km ENE	326453.1	2301965	59.9	0.06	0.60	0.54	0.66	69.86	0.03	0.34	0.31	0.38	40.17	0.11	3.15	3.03	3.46	0.07	2.34	2.27	2.58
261	4 km E	326805.5	2300178	67.1	0.21	1.19	0.98	1.31	60.59	0.12	0.68	0.56	0.75	34.84	0.31	4.12	3.81	4.53	0.21	2.48	2.27	2.73
262	4 km ESE	326411.4	2298408	79.1	0.35	1.99	1.64	2.19	96.68	0.20	1.15	0.94	1.26	55.59	0.60	7.31	6.71	8.04	0.37	4.16	3.78	4.57
263	4 km SE	325308.1	2297008	92.5	0.47	1.89	1.42	2.08	105.22	0.27	1.09	0.82	1.20	60.50	0.73	6.43	5.69	7.07	0.71	4.18	3.47	4.60
264	4 km SSE	323871	2295995	116.8	3.84	13.62	9.78	14.98	40.63	2.21	7.83	5.62	8.61	23.36	5.75	20.78	15.03	22.86	2.67	4.08	1.41	4.49
265	4 km S	322138.3	2295571	104.9	0.41	1.49	1.08	1.64	35.63	0.24	0.86	0.62	0.94	20.49	0.60	3.27	2.66	3.59	0.40	1.83	1.43	2.01
266	4 km SSW	320385.4	2295946	88.9	0.50	1.50	1.00	1.65	33.56	0.29	0.86	0.57	0.95	19.30	0.73	3.32	2.59	3.66	0.44	1.36	0.91	1.49
267	4 km SW	318963.4	2297003	81.7	0.31	1.80	1.49	1.98	62.82	0.18	1.04	0.86	1.14	36.12	0.47	5.27	4.80	5.80	0.30	2.97	2.67	3.27
268	4 km WSW	318011.9	2298469	72.2	0.18	0.80	0.62	0.88	65.76	0.10	0.46	0.36	0.51	37.81	0.25	3.15	2.90	3.47	0.18	2.39	2.21	2.63
269	4 km W	317753.4	2300178	90.1	0.28	1.02	0.74	1.12	65.29	0.16	0.58	0.43	0.64	37.54	0.43	3.89	3.46	4.27	0.30	2.65	2.35	2.91
270	4 km WNW	318148.9	2301830	84	0.20	0.57	0.37	0.63	48.80	0.12	0.33	0.21	0.36	28.06	0.28	2.22	1.94	2.45	0.21	1.59	1.38	1.75
271	4 km NW	318992.9	2303323	74.8	0.27	1.66	1.39	1.83	115.96	0.16	0.95	0.80	1.05	66.68	0.46	5.37	4.91	5.91	0.29	3.91	3.61	4.30
272	4 km NNW	320402	2304370	74.8	0.33	0.89	0.56	0.97	41.77	0.19	0.51	0.32	0.56	24.02	0.48	2.78	2.30	3.06	0.30	1.58	1.27	1.73
273	5 km N	322138.3	2305725	60.1	0.13	0.72	0.60	0.79	59.77	0.07	0.41	0.34	0.46	34.37	0.18	2.75	2.57	3.02	0.12	1.98	1.86	2.18
274	5 km NNE	324232.9	2305235	50.8	0.07	0.40	0.34	0.44	31.53	0.04	0.23	0.19	0.25	18.13	0.09	1.66	1.57	1.82	0.07	1.13	1.07	1.25
275	5 km NE	326080.6	2304120	59.4	0.17	0.72	0.55	0.79	59.45	0.10	0.41	0.32	0.45	34.18	0.27	3.10	2.83	3.41	0.18	2.29	2.11	2.52
276	5 km ENE	327377.1	2302348	53.8	0.05	0.49	0.44	0.54	57.71	0.03	0.28	0.25	0.31	33.18	0.09	2.59	2.50	2.84	0.05	1.93	1.88	2.13
277	5 km E	327805.5	2300178	60.3	0.17	0.89	0.72	0.98	49.66	0.09	0.51	0.41	0.56	28.55	0.24	3.11	2.87	3.42	0.16	1.90	1.74	2.09
278	5 km ESE	327336.2	2298025	87.1	0.28	1.70	1.42	1.87	87.02	0.16	0.98	0.82	1.08	50.04	0.48	6.44	5.97	7.09	0.30	3.72	3.42	4.09
279	5 km SE	326018.4	2296298	119.7	0.60	3.29	2.69	3.62	80.29	0.34	1.89	1.55	2.08	46.17	0.99	12.19	11.20	13.41	0.91	7.66	6.75	8.43
280	5 km SSE	324254.5	2295069	113.6	2.91	9.34	6.43	10.28	34.16	1.67	5.37	3.70	5.91	19.64	4.43	14.09	9.66	15.50	2.08	3.16	1.08	3.48
281	5 km S	322138.3	2294571	92.9	0.21	0.69	0.49	0.76	28.73	0.12	0.40	0.28	0.44	16.52	0.31	1.85	1.54	2.04	0.25	1.48	1.23	1.63
282	5 km SSW	320002.4	2295021	93.2	0.52	1.71	1.19	1.88	25.85	0.30	0.98	0.69	1.08	14.86	0.80	4.06	3.26	4.46	0.51	1.71	1.20	1.88
283	5 km SW	318256.2	2296296	89.5	0.33	1.89	1.57	2.08	48.89	0.19	1.09	0.90	1.20	28.11	0.52	5.45	4.93	6.00	0.34	2.83	2.49	3.11
284	5 km WSW	317087.5	2298086	74.5	0.18	0.77	0.59	0.85	50.66	0.10	0.44	0.34	0.49	29.13	0.26	2.75	2.49	3.02	0.19	1.97	1.78	2.16
285	5 km W	316752.9	2300178	91.1	0.24	0.90	0.66	0.99	47.30	0.14	0.52	0.38	0.57	27.20	0.38	3.32	2.95	3.66	0.27	2.15	1.88	2.36
286	5 km WNW	317222.7	2302214	80.8	0.15	0.46	0.31	0.51	36.39	0.09	0.27	0.18	0.29	20.92	0.22	1.84	1.62	2.02	0.16	1.25	1.09	1.37
287	5 km NW	318284.7	2304031	81.5	0.26	1.59	1.32	1.74	98.36	0.15	0.91	0.76	1.00	56.56	0.43	5.41	4.98	5.95	0.29	3.28	2.99	3.61

Air quality prediction modeling due to plant operation - input & output data

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m³)																	
					PM_{10}					$PM_{2.5}$					SO_2				NO_2			
					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
288	5 km NNW	320019.2	2305294	72.5	0.26	0.82	0.56	0.91	34.27	0.15	0.47	0.32	0.52	19.70	0.40	2.60	2.20	2.86	0.29	1.54	1.25	1.69
289	7 km N	322138.3	2307725	54.3	0.10	0.58	0.48	0.64	46.22	0.06	0.33	0.27	0.37	26.57	0.16	2.23	2.07	2.45	0.11	1.57	1.47	1.73
290	7 km NNE	324998.4	2307083	63.8	0.12	0.72	0.60	0.80	24.03	0.07	0.42	0.35	0.46	13.82	0.16	1.46	1.29	1.60	0.09	0.85	0.76	0.93
291	7 km NE	327496.5	2305536	61.2	0.14	0.64	0.50	0.71	44.43	0.08	0.37	0.29	0.41	25.55	0.24	2.50	2.26	2.75	0.16	1.78	1.62	1.96
292	7 km ENE	329225.1	2303113	59.9	0.06	0.36	0.31	0.40	43.30	0.03	0.21	0.18	0.23	24.90	0.08	1.93	1.85	2.12	0.06	1.45	1.39	1.59
293	7 km E	329805.6	2300178	62.7	0.13	0.69	0.55	0.76	41.37	0.08	0.40	0.32	0.44	23.79	0.20	2.26	2.06	2.48	0.13	1.50	1.37	1.65
294	7 km ESE	329185	2297259	81.2	0.18	1.23	1.05	1.35	71.70	0.10	0.71	0.60	0.78	41.23	0.31	4.86	4.55	5.35	0.20	2.94	2.74	3.23
295	7 km SE	327436.2	2294880	105.5	0.36	1.90	1.54	2.09	51.70	0.21	1.09	0.88	1.20	29.73	0.52	5.47	4.95	6.02	0.48	2.69	2.21	2.95
296	7 km SSE	325020.7	2293219	102.8	1.67	3.83	2.16	4.22	26.08	0.96	2.20	1.24	2.42	14.99	2.55	6.02	3.47	6.62	1.20	2.04	0.84	2.24
297	7 km S	322138.3	2292570	115.7	0.31	1.55	1.24	1.70	22.17	0.18	0.89	0.71	0.98	12.75	0.51	4.05	3.54	4.46	0.35	1.83	1.48	2.02
298	7 km SSW	319236.7	2293173	110.7	0.51	2.17	1.66	2.39	19.27	0.30	1.25	0.95	1.37	11.08	0.85	6.03	5.18	6.63	0.58	2.64	2.07	2.91
299	7 km SW	316842	2294881	100	0.40	1.95	1.55	2.14	37.59	0.23	1.12	0.89	1.23	21.62	0.67	5.55	4.88	6.10	0.46	2.88	2.42	3.17
300	7 km WSW	315239.2	2297320	80.9	0.18	0.78	0.60	0.86	34.39	0.10	0.45	0.35	0.49	19.78	0.28	2.50	2.22	2.75	0.19	1.57	1.38	1.73
301	7 km W	314752.4	2300178	101.7	0.23	0.98	0.75	1.07	35.06	0.13	0.56	0.43	0.62	20.16	0.37	3.25	2.87	3.57	0.26	1.80	1.54	1.98
302	7 km WNW	315372.4	2302980	85	0.16	0.57	0.41	0.63	23.13	0.09	0.33	0.24	0.36	13.30	0.24	1.70	1.46	1.87	0.15	0.99	0.84	1.09
303	7 km NW	316869.3	2305447	89.8	0.25	1.33	1.08	1.46	75.74	0.14	0.76	0.62	0.84	43.55	0.41	5.19	4.78	5.71	0.29	3.29	3.00	3.61
304	7 km NNW	319253.6	2307142	69.6	0.19	0.72	0.53	0.79	25.36	0.11	0.41	0.30	0.46	14.58	0.30	2.25	1.95	2.48	0.24	1.34	1.10	1.47
305	10 km N	322138.3	2310726	59.3	0.10	0.56	0.46	0.62	35.05	0.06	0.32	0.26	0.36	20.16	0.16	2.02	1.86	2.22	0.11	1.32	1.20	1.45
306	10 km NNE	326146.5	2309854	73.2	0.15	0.90	0.75	0.99	18.13	0.08	0.52	0.43	0.57	10.42	0.22	2.07	1.85	2.28	0.13	0.81	0.68	0.89
307	10 km NE	329619.1	2307659	79.6	0.17	0.85	0.68	0.94	34.23	0.10	0.49	0.39	0.54	19.68	0.29	2.52	2.22	2.77	0.21	1.60	1.39	1.76
308	10 km ENE	331996.9	2304261	85.8	0.10	0.41	0.32	0.46	31.89	0.06	0.24	0.18	0.26	18.34	0.16	1.41	1.25	1.55	0.11	1.07	0.96	1.17
309	10 km E	332805.6	2300178	52	0.09	0.49	0.40	0.54	30.79	0.05	0.28	0.23	0.31	17.70	0.13	1.61	1.47	1.77	0.09	1.10	1.01	1.21
310	10 km ESE	331957.4	2296111	84.2	0.12	0.88	0.76	0.97	62.62	0.07	0.51	0.44	0.56	36.00	0.20	3.73	3.52	4.10	0.14	2.40	2.26	2.64
311	10 km SE	329560.3	2292756	87.1	0.25	1.24	0.99	1.37	34.71	0.15	0.71	0.57	0.78	19.96	0.36	3.64	3.27	4.00	0.21	1.92	1.71	2.11
312	10 km SSE	326169.5	2290446	104.5	1.28	2.90	1.62	3.19	19.47	0.73	1.67	0.93	1.83	11.19	2.05	5.91	3.86	6.51	1.29	2.40	1.12	2.64
313	10 km S	322138.3	2289570	131.9	0.24	1.42	1.19	1.57	25.51	0.14	0.82	0.68	0.90	14.67	0.42	4.24	3.82	4.66	0.27	1.84	1.57	2.03
314	10 km SSW	318088.4	2290400	128.2	0.29	1.90	1.61	2.09	31.97	0.17	1.09	0.92	1.20	18.38	0.58	6.31	5.72	6.94	0.41	3.07	2.66	3.37
315	10 km SW	314720.6	2292760	96.3	0.22	1.25	1.03	1.37	30.18	0.13	0.72	0.59	0.79	17.36	0.40	3.71	3.31	4.08	0.26	1.95	1.69	2.15
316	10 km WSW	312467.1	2296172	81.8	0.14	0.66	0.53	0.73	23.25	0.08	0.38	0.30	0.42	13.37	0.22	2.09	1.87	2.30	0.15	1.21	1.05	1.33
317	10 km W	311752	2300178	107.6	0.15	0.80	0.64	0.88	28.55	0.09	0.46	0.37	0.50	16.42	0.26	2.76	2.50	3.04	0.18	1.40	1.22	1.54
318	10 km WNW	312598.8	2304129	98	0.18	0.77	0.58	0.84	17.00	0.11	0.44	0.33	0.48	9.77	0.30	1.75	1.45	1.93	0.19	0.79	0.60	0.87
319	10 km NW	314747.1	2307569	82.3	0.18	0.92	0.73	1.01	56.55	0.10	0.53	0.42	0.58	32.52	0.29	3.77	3.48	4.14	0.19	2.52	2.33	2.77
320	10 km NNW	318105.4	2309914	69.5	0.14	0.62	0.48	0.69	18.53	0.08	0.36	0.28	0.39	10.66	0.23	1.92	1.69	2.11	0.18	1.08	0.90	1.19
A1	Within	322574.9	2300263	65.4	1.25	4.97	3.72	5.46	40.93	0.72	2.86	2.14	3.14	23.53	0.98	7.57	6.59	8.33	0.15	4.86	4.71	5.35
A2	0.4 km, NW	321651.1	2300984	80.5	1.43	4.55	3.12	5.01	155.84	0.82	2.62	1.80	2.88	89.61	1.99	16.41	14.41	18.05	1.12	6.18	5.06	6.80
A3	0.8 km, SE	323012	2299344	74.6	0.84	3.18	2.34	3.50	174.36	0.48	1.83	1.35	2.01	100.26	1.24	9.03	7.79	9.93	0.67	6.55	5.89	7.21

Air quality prediction modeling due to plant operation - input & output data

Receptor No	Distance & Dir from boundary	Co-ordinates X	Co-ordinates Y	Elev (m)	Ground level concentrations (µg/m³)																	
					PM_{10}					$PM_{2.5}$					SO_2				NO_2			
					Normal			Ab-normal	Emergency	Normal			Ab-normal	Emergency	Normal			Ab-normal	Normal			Ab-normal
					Existing	After Expn	Increment			Existing	After Expn	Increment			Existing	After Expn	Increment		Existing	After Expn	Increment	
A4	2.2 km, SE	323866.1	2298215	79.4	0.35	1.94	1.60	2.14	206.88	0.20	1.12	0.92	1.23	118.96	0.46	8.75	8.28	9.62	0.99	7.05	6.07	7.76
A5	4.8 km, SW	318265.7	2296634	90.3	0.41	1.66	1.26	1.83	55.31	0.24	0.96	0.72	1.05	31.80	0.63	4.64	4.02	5.11	0.40	2.49	2.09	2.74
A6	1.6 km, E	324303.1	2300490	64	0.42	1.95	1.53	2.15	130.66	0.24	1.12	0.88	1.23	75.13	0.64	6.52	5.88	7.17	0.43	4.21	3.78	4.63
A7	1.2 km, NE	323428.2	2301327	73.1	0.49	2.16	1.67	2.38	162.98	0.28	1.24	0.96	1.37	93.71	0.63	9.35	8.72	10.28	0.41	6.35	5.93	6.98
A8	1.4 km, SW	320927.5	2298722	72.6	0.44	1.98	1.54	2.18	134.75	0.25	1.14	0.88	1.25	77.48	0.60	7.34	6.74	8.07	0.36	5.44	5.08	5.98
Ganthigarhia PF	3.4km W	317889.8	2300450	94.8	0.31	2.14	1.82	2.35	67.26	0.18	1.23	1.05	1.35	38.67	0.49	3.44	2.95	3.78	0.33	2.38	2.04	2.62
Jharbandh RF	3.2km SSE	323859.2	2296923	116	4.61	26.40	21.79	29.04	61.08	2.65	15.18	12.53	16.70	35.12	6.71	40.67	33.97	44.74	4.37	14.92	10.55	16.41
Nimidha RF	4.9km SE	327194.1	2297839	86.7	0.23	1.62	1.39	1.78	109.27	0.13	0.93	0.80	1.02	62.83	0.39	6.06	5.67	6.67	0.24	3.99	3.75	4.39
	MAXIMUM				**4.61**	**26.40**	**21.79**	**29.04**	**323.03**	**2.65**	**15.18**	**12.53**	**16.70**	**185.74**	**6.71**	**40.67**	**33.97**	**44.74**	**4.37**	**14.92**	**10.55**	**16.41**

Standards for Ambient air quality (MoEF Notification G.S. R 826(E) dated 16/11/2009)

Pollutants	Concentration of ambient air (All concentrations are micro g/m³) for 24 hours average	
	Industrial area, Residential, Rural and Other areas	Ecologically sensitive area (Notified by Central Govt.)
Sulphur Dioxide (SO_2)	80	80
Oxides of Nitrogen as NO_2	80	80
Particulate Matter (size ≤10µm)	100	100
Particulate Matter (size ≤2.5µm)	60	60

The receptors assumed for modelling is shown in Fig 1 and calculated incremental ground level concentrations of PM_{10}, $PM_{2.5}$, SO_2 and NOx due to expansion of plant capacity are shown with contours in Fig 2 to Fig 5 respectively.

Air quality prediction modeling due to plant operation - input & output data

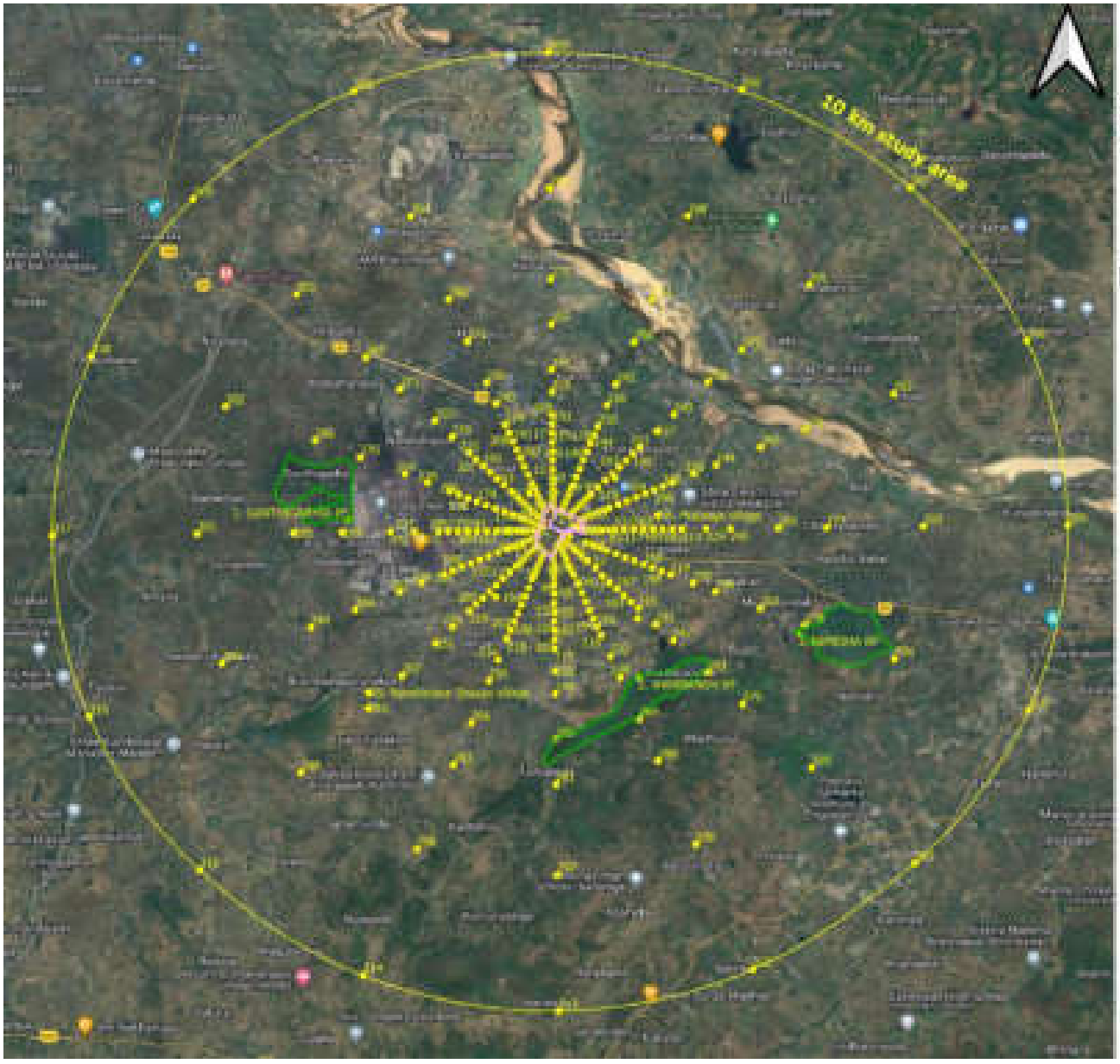
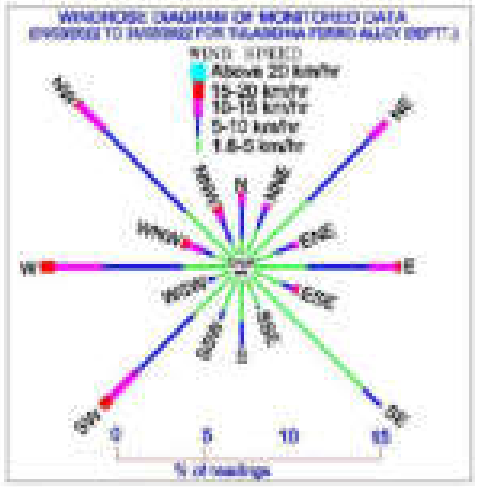
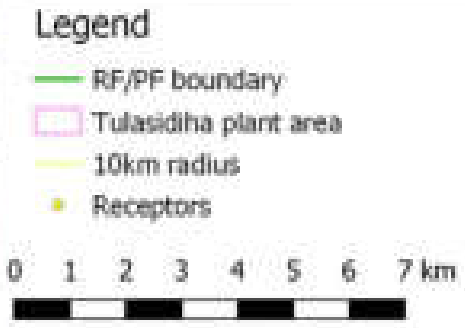


FIG : 1
TULASIDIHA FERRO ALLOY DIVISION
(Expn. from 55008 TPA to 293376 TPA, sinter 43200 to 561600 TPA, metal recovery 19980 to 115400 TPA with additional Pig Iron (369600 TPA), power plant 150 MW) of M/S RUNGTA MINES LTD.
(Distt. Dhenkanal, Odisha)

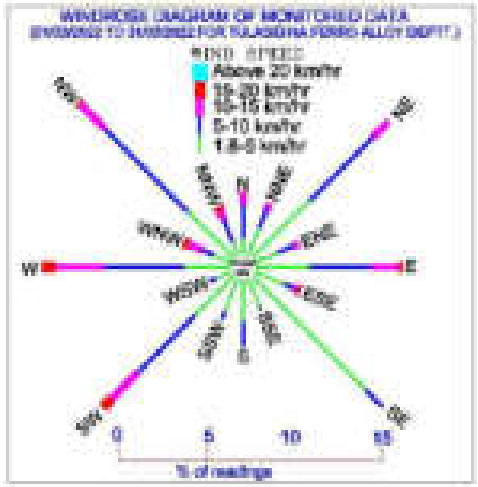




Air quality prediction modeling due to plant operation - input & output data



FIG : 2
TULASIDIHA FERRO ALLOY DIVISION
(Expn. from 55008 TPA to 293376 TPA, sinter 43200 to 561600 TPA, metal recovery 19980 to 115400 TPA with additional Pig Iron (369600 TPA), power plant 150 MW) of M/S RUNGTA MINES LTD.
(Distt. Dhenkanal, Odisha)





Air quality prediction modeling due to plant operation - input & output data

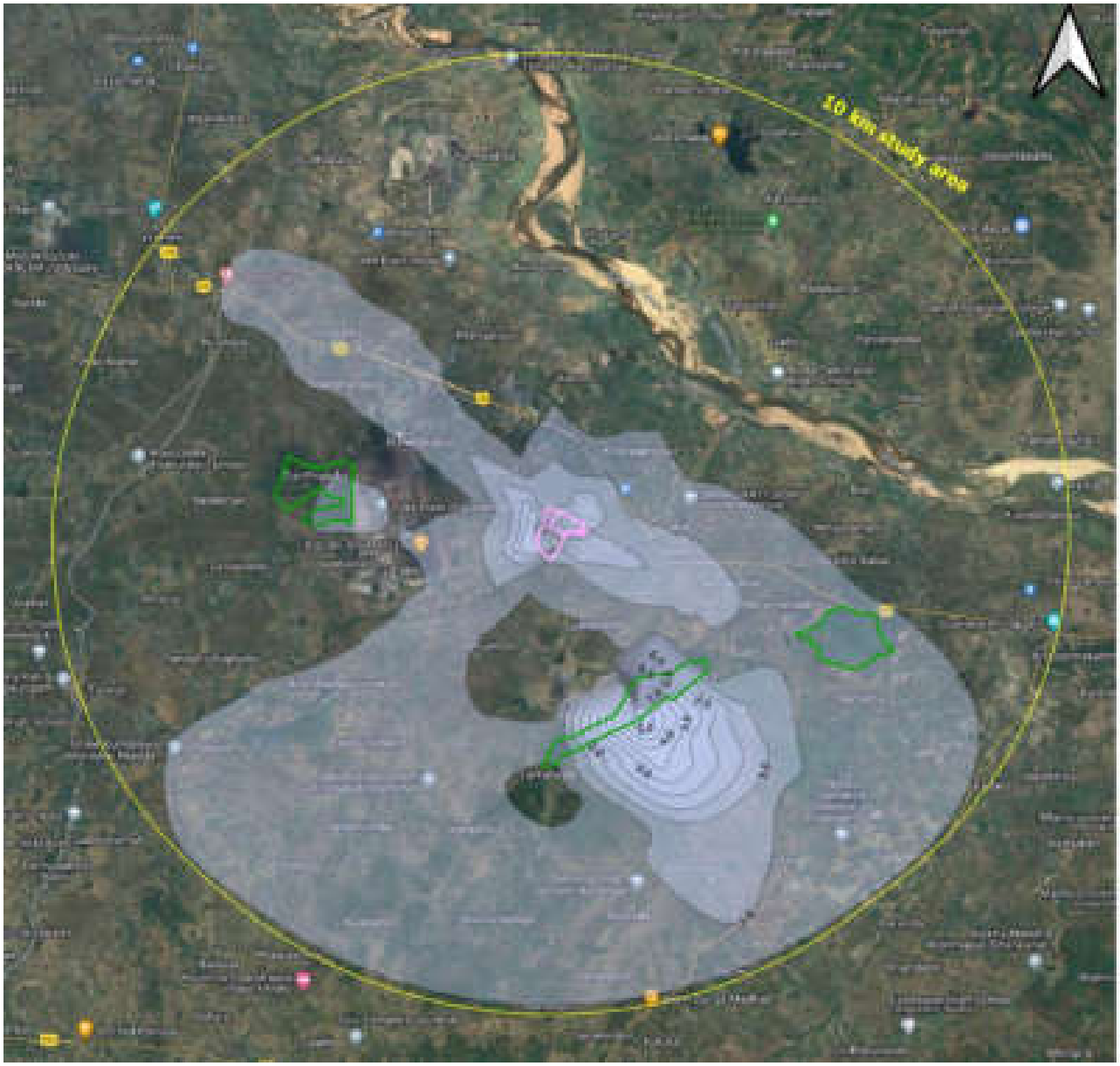
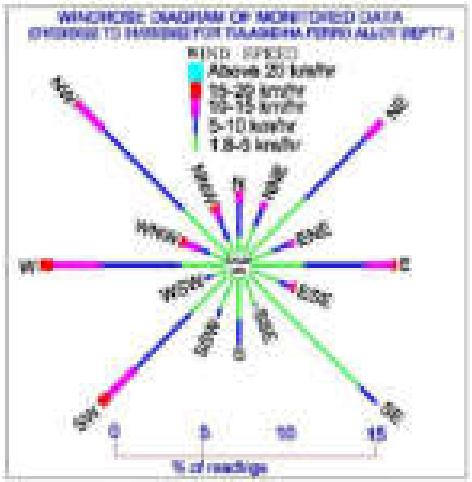


FIG : 3
TULASIDIHA FERRO ALLOY DIVISION
(Expn. from 55008 TPA to 293376 TPA, sinter 43200 to 561600 TPA, metal recovery 19980 to 115400 TPA with additional Pig Iron (369600 TPA), power plant 150 MW) of M/S RUNGTA MINES LTD. (Distt. Dhenkanal, Odisha)

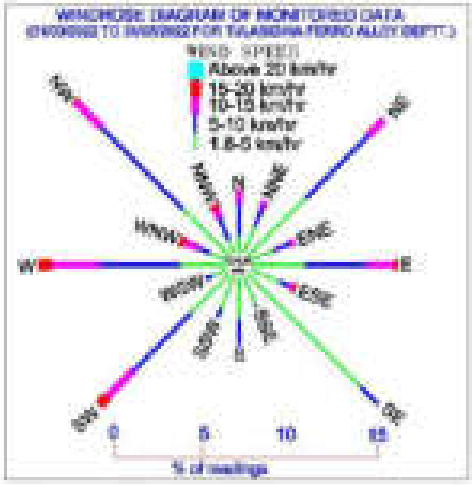




Air quality prediction modeling due to plant operation - input & output data



FIG : 4
TULASIDIHA FERRO ALLOY DIVISION
(Expn. from 55008 TPA to 293376 TPA, sinter 43200 to 561600 TPA, metal recovery 19980 to 115400 TPA with additional Pig Iron (369600 TPA), power plant 150 MW) of M/S RUNGTA MINES LTD.
(Distt. Dhenkanal, Odisha)





Air quality prediction modeling due to plant operation - input & output data

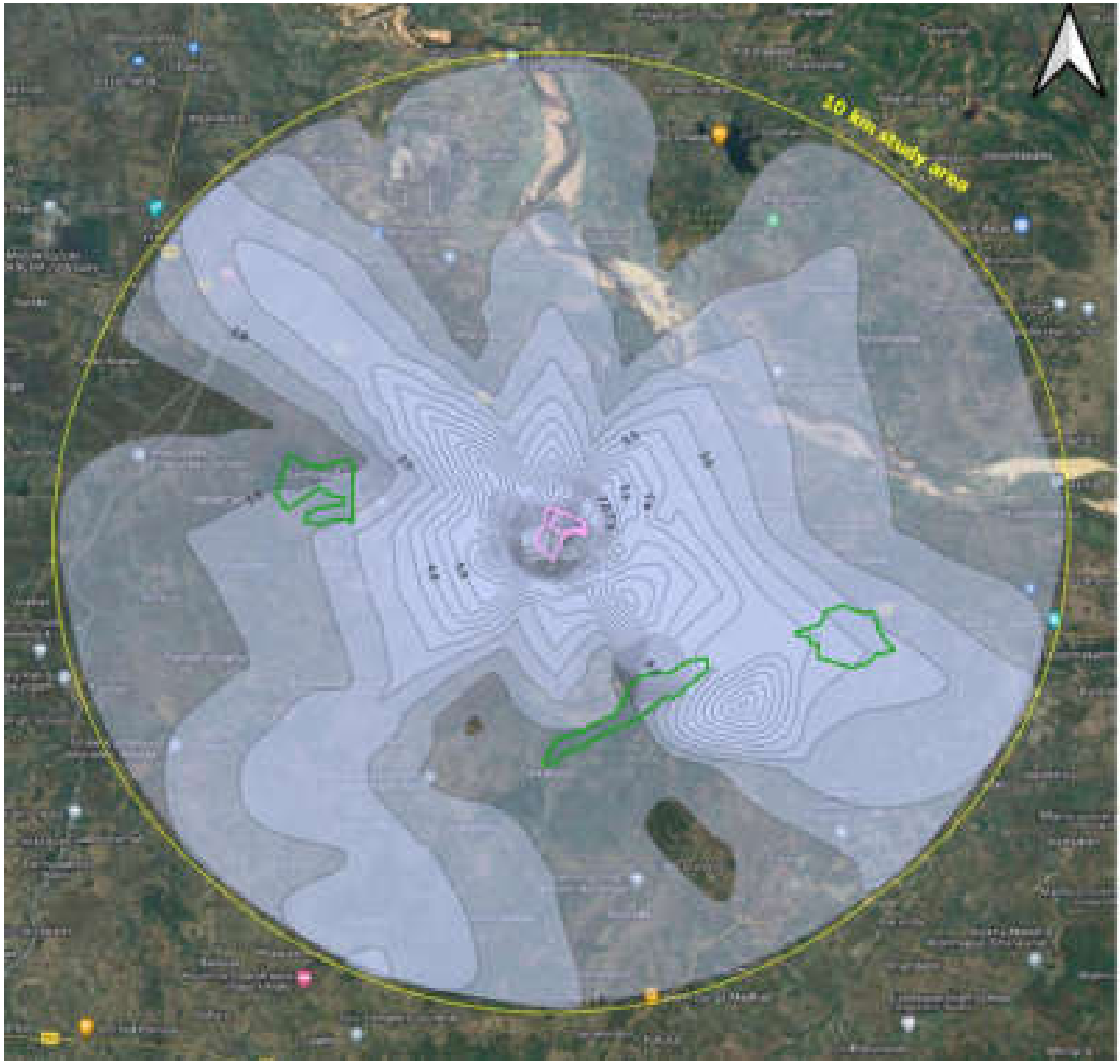
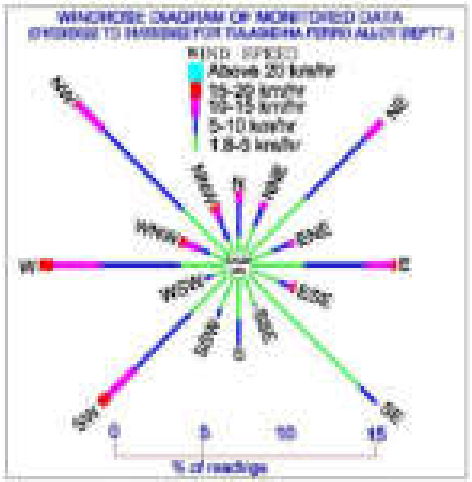


FIG : 5
TULASIDIHA FERRO ALLOY DIVISION
(Expn. from 55008 TPA to 293376 TPA, sinter 43200 to 561600 TPA, metal recovery 19980 to 115400 TPA with additional Pig Iron (369600 TPA), power plant 150 MW) of M/S RUNGTA MINES LTD. (Distt. Dhenkanal, Odisha)





ANNEXURE : XVIII

**AIR QUALITY MODELLING USING CALINE4 MODEL (CALIFORNIA LINE SOURCE DISPERSION MODEL - VERSION 2.1, DATED JUNE 1989)
FOR TRANSPORTATION OF RAW MATERIAL AS WELL AS FINISHED PRODUCT BY ROAD FROM TULASIDIHA FERRO ALLOYS DIVISION FROM/ TOWARDS TALCHER/ BHUBANESHWAR/ OPEN MARKET**

I. SITE VARIABLES

U= 1.9 M/S Z0= 10. CM ALT= 0. (M) BRG= 135.0 DEGREES
VD= 0.0 CM/S CLAS= 1 (A) VS= 0.0 CM/S MIXH= 751. M
AMB= 0.0 PPM SIGTH= 10. DEGREES TEMP= 32.5 DEGREE (C)

II. LINK VARIABLES

The entire route used for transportation of raw material and finished products by 20/25 T capacity of tipping trucks from the plant to open market or from/ towards Talcher/ Bhubaneshwar by road within the study area of 10 km has been considered (see Fig 1) and divided in 6 sections (S01 to S06) for modelling purpose as shown in Fig 2. The emission rate calculations has been given below :

Section	Raw material	Finished product	Solid waste	Truck capacity	Hourly truck movement	Avg. Speed	Emission rate (g/mile/truck)			
	TPA	TPA	TPA	(T)	(to & fro)	(kmph)	PM_{10}	$PM_{2.5}$	SO_2	NO_x
Present	273143	98208	62708	20/25	4	40	15.705	3.806	0.011	2.164
After Expn	3432200	700400	454697	20/25	43	40				

Note : Assumptions for emission calculations are : silt load 0.6 g/m2 (from AP42), Wet days 8.1 out of 92 days of monitoring period (IMD Angul 1991-2010) and all trucks will be of Euro-VI base engine.

The emissions considered are as follows:

- PM_{10} & $PM_{2.5}$ includes wheel disturbed road silt
- The MODE has been set CO for calculating SO_2 concentrations.

The details of each section (S01 to S06) is given below:

Sec	Link	Link Coordinates (m)				Type	VPH		Emission Factor (g/mile/truck)				H	W
		X1	Y1	X2	Y2		Present	Future	PM_{10}	$PM_{2.5}$	SO_2	NO_X	(m)	(m)
S01	A.	322779	2300348	322884	2300432	AG	4	43	15.71	3.81	0.011	2.16	0	10
	B.	322884	2300432	322931	2300501	AG	4	43	15.71	3.81	0.011	2.16	0	10
	C.	322931	2300501	323000	2300497	AG	4	43	15.71	3.81	0.011	2.16	0	10
	D.	323000	2300497	323049	2300463	AG	4	43	15.71	3.81	0.011	2.16	0	10
	E.	323049	2300463	323098	2300493	AG	4	43	15.71	3.81	0.011	2.16	0	10
	F.	323098	2300493	323189	2300754	AG	4	43	15.71	3.81	0.011	2.16	0	10
	G.	323189	2300754	323286	2300953	AG	4	43	15.71	3.81	0.011	2.16	0	10
	H.	323286	2300953	323333	2301119	AG	4	43	15.71	3.81	0.011	2.16	0	10
S02	A.	323333	2301119	322771	2302072	AG	4	43	15.71	3.81	0.011	2.16	0	20
	B.	322771	2302072	322623	2302243	AG	4	43	15.71	3.81	0.011	2.16	0	20
	C.	322623	2302243	322418	2302387	AG	4	43	15.71	3.81	0.011	2.16	0	20
	D.	322418	2302387	320992	2303002	AG	4	43	15.71	3.81	0.011	2.16	0	20
	E.	320992	2303002	319535	2303664	AG	4	43	15.71	3.81	0.011	2.16	0	20
	F.	319535	2303664	318501	2304068	AG	4	43	15.71	3.81	0.011	2.16	0	20
	G.	318501	2304068	317310	2304376	AG	4	43	15.71	3.81	0.011	2.16	0	20

ANNEXURE : XVIII Contd.

Sec	Link	Link Coordinates (m)				Type	VPH		Emission Factor (g/mile/truck)				H	W
		X1	Y1	X2	Y2		Present	Future	PM_{10}	$PM_{2.5}$	SO_2	NO_X	(m)	(m)
	H.	317310	2304376	316752	2304636	AG	4	43	15.71	3.81	0.011	2.16	0	20
S03	A.	316752	2304636	316163	2305258	AG	4	43	15.71	3.81	0.011	2.16	0	20
	B.	316163	2305258	315502	2305530	AG	4	43	15.71	3.81	0.011	2.16	0	20
	C.	315502	2305530	314880	2305674	AG	4	43	15.71	3.81	0.011	2.16	0	20
	D.	314880	2305674	314314	2305670	AG	4	43	15.71	3.81	0.011	2.16	0	20
	E.	314314	2305670	314160	2306910	AG	4	43	15.71	3.81	0.011	2.16	0	20
S04	A.	323333	2301119	323494	2300854	AG	4	43	15.71	3.81	0.011	2.16	0	20
	B.	323494	2300854	323960	2300341	AG	4	43	15.71	3.81	0.011	2.16	0	20
	C.	323960	2300341	324279	2299691	AG	4	43	15.71	3.81	0.011	2.16	0	20
	D.	324279	2299691	324417	2299568	AG	4	43	15.71	3.81	0.011	2.16	0	20
	E.	324417	2299568	324583	2299506	AG	4	43	15.71	3.81	0.011	2.16	0	20
	F.	324583	2299506	326320	2299451	AG	4	43	15.71	3.81	0.011	2.16	0	20
	G.	326320	2299451	326523	2299457	AG	4	43	15.71	3.81	0.011	2.16	0	20
	H.	326523	2299457	326661	2299423	AG	4	43	15.71	3.81	0.011	2.16	0	20
S05	A.	326661	2299423	326878	2299306	AG	4	43	15.71	3.81	0.011	2.16	0	20
	B.	326878	2299306	327524	2298859	AG	4	43	15.71	3.81	0.011	2.16	0	20
	C.	327524	2298859	327755	2298699	AG	4	43	15.71	3.81	0.011	2.16	0	20
	D.	327755	2298699	328010	2298645	AG	4	43	15.71	3.81	0.011	2.16	0	20
	E.	328010	2298645	328254	2298467	AG	4	43	15.71	3.81	0.011	2.16	0	20
	F.	328254	2298467	328395	2298349	AG	4	43	15.71	3.81	0.011	2.16	0	20
	G.	328395	2298349	328570	2298314	AG	4	43	15.71	3.81	0.011	2.16	0	20
	H.	328570	2298314	328834	2298349	AG	4	43	15.71	3.81	0.011	2.16	0	20
S06	A.	328834	2298349	329091	2298415	AG	4	43	15.71	3.81	0.011	2.16	0	20
	B.	329091	2298415	329221	2298437	AG	4	43	15.71	3.81	0.011	2.16	0	20
	C.	329221	2298437	329872	2298341	AG	4	43	15.71	3.81	0.011	2.16	0	20
	D.	329872	2298341	331974	2298049	AG	4	43	15.71	3.81	0.011	2.16	0	20
	E.	331974	2298049	332347	2297891	AG	4	43	15.71	3.81	0.011	2.16	0	20
	F.	332347	2297891	332555	2297836	AG	4	43	15.71	3.81	0.011	2.16	0	20

RECEPTOR WISE RESULTS

The receptors have been assumed at a distance of 20 m away from the road and receptor wise results are listed below:

Sec. No.	Receptor No	Coordinates (m)			Incremental GLC (µg/m^3)											
		X	Y	Z	PM_{10}			$PM_{2.5}$			SO_2			NO_2		
					Present	Future	Incre-ment	Present	Future	Incre-ment	Present	Future	Incre-ment	Present	Future	Incre-ment
S01	1	322767	2300364	1.5	0.61	0.65	0.04	0.15	0.16	0.01	0.00	0.00	0.00	0.10	0.11	0.01
	2	322869	2300446	1.5	0.78	0.83	0.05	0.19	0.20	0.01	0.00	0.00	0.00	0.13	0.14	0.01
	3	322920	2300521	1.5	1.00	1.08	0.08	0.24	0.26	0.02	0.00	0.00	0.00	0.17	0.18	0.01
	4	323007	2300516	1.5	0.47	0.51	0.04	0.12	0.12	0.00	0.00	0.00	0.00	0.08	0.09	0.01
	5	323050	2300487	1.5	0.79	0.85	0.06	0.19	0.21	0.02	0.00	0.00	0.00	0.13	0.14	0.01
	6	323081	2300506	1.5	0.82	0.88	0.06	0.20	0.21	0.01	0.00	0.00	0.00	0.14	0.15	0.01
	7	323171	2300762	1.5	0.84	0.90	0.06	0.20	0.22	0.02	0.00	0.00	0.00	0.14	0.15	0.01
	8	323268	2300960	1.5	0.82	0.88	0.06	0.20	0.21	0.01	0.00	0.00	0.00	0.14	0.15	0.01
	9	323311	2301116	1.5	0.86	0.92	0.06	0.21	0.22	0.01	0.00	0.00	0.00	0.14	0.15	0.01
	10	322792	2300333	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	11	322899	2300418	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12	322941	2300480	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	13	322994	2300477	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	14	323049	2300439	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	15	323114	2300480	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	16	323208	2300746	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	17	323305	2300945	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	18	323340	2301069	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S02	19	323311	2301116	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	20	322754	2302060	1.5	1.61	1.73	0.12	0.39	0.42	0.03	0.00	0.00	0.00	0.27	0.29	0.02
	21	322609	2302228	1.5	1.18	1.27	0.09	0.29	0.31	0.02	0.00	0.00	0.00	0.20	0.21	0.01
	22	322409	2302369	1.5	0.29	0.32	0.03	0.07	0.08	0.01	0.00	0.00	0.00	0.05	0.05	0.00
	23	320984	2302983	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Sec. No.	Receptor No	Coordinates (m)			Incremental GLC (µg/m^3)											
		X	Y	Z	PM_{10}			$PM_{2.5}$			SO_2			NO_2		
					Present	Future	Incre-ment	Present	Future	Incre-ment	Present	Future	Incre-ment	Present	Future	Incre-ment
	24	319528	2303645	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	25	318495	2304049	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	26	317303	2304357	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	27	316740	2304619	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	28	323350	2301129	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	29	322787	2302084	1.5	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	30	322636	2302258	1.5	0.30	0.32	0.02	0.07	0.08	0.01	0.00	0.00	0.00	0.05	0.05	0.00
	31	322428	2302404	1.5	1.81	1.94	0.13	0.44	0.47	0.03	0.00	0.00	0.00	0.30	0.33	0.03
	32	321000	2303020	1.5	1.64	1.77	0.13	0.40	0.43	0.03	0.00	0.00	0.00	0.28	0.30	0.02
	33	319543	2303682	1.5	1.66	1.78	0.12	0.40	0.43	0.03	0.00	0.00	0.00	0.28	0.30	0.02
	34	318507	2304087	1.5	1.61	1.73	0.12	0.39	0.42	0.03	0.00	0.00	0.00	0.27	0.29	0.02
	35	317316	2304395	1.5	1.53	1.64	0.11	0.37	0.40	0.03	0.00	0.00	0.00	0.26	0.28	0.02
	36	316763	2304652	1.5	1.59	1.71	0.12	0.39	0.41	0.02	0.00	0.00	0.00	0.27	0.29	0.02
	A7	323428	2301327	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S03	37	316740	2304619	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	38	316152	2305241	1.5	1.06	1.14	0.08	0.26	0.28	0.02	0.00	0.00	0.00	0.18	0.19	0.01
	39	315496	2305511	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	40	314878	2305654	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	41	314296	2305650	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	42	314140	2306908	1.5	1.49	1.60	0.11	0.36	0.39	0.03	0.00	0.00	0.00	0.25	0.27	0.02
	43	316763	2304652	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	44	316175	2305275	1.5	0.69	0.74	0.05	0.17	0.18	0.01	0.00	0.00	0.00	0.12	0.13	0.01
	45	315508	2305549	1.5	1.63	1.75	0.12	0.39	0.42	0.03	0.00	0.00	0.00	0.27	0.29	0.02
	46	314882	2305694	1.5	1.52	1.63	0.11	0.37	0.40	0.03	0.00	0.00	0.00	0.26	0.28	0.02
	47	314331	2305690	1.5	1.40	1.50	0.10	0.34	0.36	0.02	0.00	0.00	0.00	0.24	0.25	0.01
	48	314180	2306913	1.5	0.05	0.05	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00

Sec. No.	Receptor No	Coordinates (m)			Incremental GLC (µg/m^3)											
		X	Y	Z	PM_{10}			$PM_{2.5}$			SO_2			NO_2		
					Present	Future	Incre-ment	Present	Future	Incre-ment	Present	Future	Incre-ment	Present	Future	Incre-ment
S04	49	323350	2301129	1.5	0.08	0.09	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.01	0.02	0.01
	50	323510	2300866	1.5	0.60	0.65	0.05	0.15	0.16	0.01	0.00	0.00	0.00	0.10	0.11	0.01
	51	323977	2300352	1.5	0.05	0.05	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00
	52	324295	2299704	1.5	0.90	0.97	0.07	0.22	0.24	0.02	0.00	0.00	0.00	0.15	0.16	0.01
	53	324427	2299585	1.5	1.55	1.66	0.11	0.38	0.40	0.02	0.00	0.00	0.00	0.26	0.28	0.02
	54	324587	2299526	1.5	1.41	1.52	0.11	0.34	0.37	0.03	0.00	0.00	0.00	0.24	0.26	0.02
	55	326320	2299471	1.5	1.38	1.48	0.10	0.34	0.36	0.02	0.00	0.00	0.00	0.23	0.25	0.02
	56	326525	2299477	1.5	1.53	1.65	0.12	0.37	0.40	0.03	0.00	0.00	0.00	0.26	0.28	0.02
	57	326668	2299442	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	58	323340	2301069	1.5	1.79	1.93	0.14	0.44	0.47	0.03	0.00	0.00	0.00	0.30	0.32	0.02
	59	323478	2300842	1.5	1.26	1.35	0.09	0.30	0.33	0.03	0.00	0.00	0.00	0.21	0.23	0.02
	60	323944	2300329	1.5	1.69	1.82	0.13	0.41	0.44	0.03	0.00	0.00	0.00	0.28	0.31	0.03
	61	324263	2299679	1.5	0.29	0.31	0.02	0.07	0.07	0.00	0.00	0.00	0.00	0.05	0.05	0.00
	62	324406	2299551	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	63	324579	2299486	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	64	326320	2299431	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	65	326521	2299436	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	66	326654	2299404	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	A6	324303	2300490	1.5	0.04	0.04	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00
S05	67	326668	2299442	1.5	1.65	1.78	0.13	0.40	0.43	0.03	0.00	0.00	0.00	0.28	0.30	0.02
	68	326889	2299323	1.5	1.61	1.73	0.12	0.39	0.42	0.03	0.00	0.00	0.00	0.27	0.29	0.02
	69	327536	2298875	1.5	1.53	1.65	0.12	0.37	0.40	0.03	0.00	0.00	0.00	0.26	0.28	0.02
	70	327763	2298717	1.5	1.47	1.58	0.11	0.36	0.38	0.02	0.00	0.00	0.00	0.25	0.27	0.02
	71	328019	2298664	1.5	1.59	1.71	0.12	0.39	0.42	0.03	0.00	0.00	0.00	0.27	0.29	0.02
	72	328266	2298482	1.5	1.03	1.11	0.08	0.25	0.27	0.02	0.00	0.00	0.00	0.17	0.19	0.02
	73	328404	2298367	1.5	1.46	1.57	0.11	0.35	0.38	0.03	0.00	0.00	0.00	0.25	0.26	0.01

Sec. No.	Receptor No	Coordinates (m)			Incremental GLC (µg/m^3)											
		X	Y	Z	PM_{10}			$PM_{2.5}$			SO_2			NO_2		
					Present	Future	Incre-ment	Present	Future	Incre-ment	Present	Future	Incre-ment	Present	Future	Incre-ment
	74	328571	2298334	1.5	1.32	1.42	0.10	0.32	0.35	0.03	0.00	0.00	0.00	0.22	0.24	0.02
	75	328830	2298368	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	76	326654	2299404	1.5	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	77	326868	2299289	1.5	0.07	0.07	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.01	0.01	0.00
	78	327513	2298842	1.5	0.04	0.04	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00
	79	327747	2298680	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	80	328002	2298627	1.5	0.10	0.11	0.01	0.03	0.03	0.00	0.00	0.00	0.00	0.02	0.02	0.00
	81	328241	2298451	1.5	0.15	0.16	0.01	0.04	0.04	0.00	0.00	0.00	0.00	0.02	0.03	0.01
	82	328386	2298330	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	83	328569	2298294	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	84	328838	2298329	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S06	85	328830	2298368	1.5	1.24	1.33	0.09	0.30	0.32	0.02	0.00	0.00	0.00	0.21	0.22	0.01
	86	329086	2298434	1.5	1.27	1.37	0.10	0.31	0.33	0.02	0.00	0.00	0.00	0.21	0.23	0.02
	87	329221	2298457	1.5	1.48	1.60	0.12	0.36	0.39	0.03	0.00	0.00	0.00	0.25	0.27	0.02
	88	329875	2298361	1.5	1.45	1.56	0.11	0.35	0.38	0.03	0.00	0.00	0.00	0.24	0.26	0.02
	89	331980	2298068	1.5	1.65	1.77	0.12	0.40	0.43	0.03	0.00	0.00	0.00	0.28	0.30	0.02
	90	332353	2297910	1.5	1.53	1.65	0.12	0.37	0.40	0.03	0.00	0.00	0.00	0.26	0.28	0.02
	91	332560	2297856	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	92	328838	2298329	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	93	329095	2298395	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	94	329222	2298417	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	95	329869	2298321	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	96	331969	2298029	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	97	332341	2297872	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	98	332550	2297817	1.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MAX				**1.81**	**1.94**	**0.14**	**0.44**	**0.47**	**0.03**	**0.00**	**0.00**	**0.00**	**0.30**	**0.33**	**0.03**

The prediction of above results shows that there will be no increment of GLCs on ambient air quality stations.

ANNEXURE : XVIII Contd.

FIG 1 : TRANSPORTATION ROUTE MAP

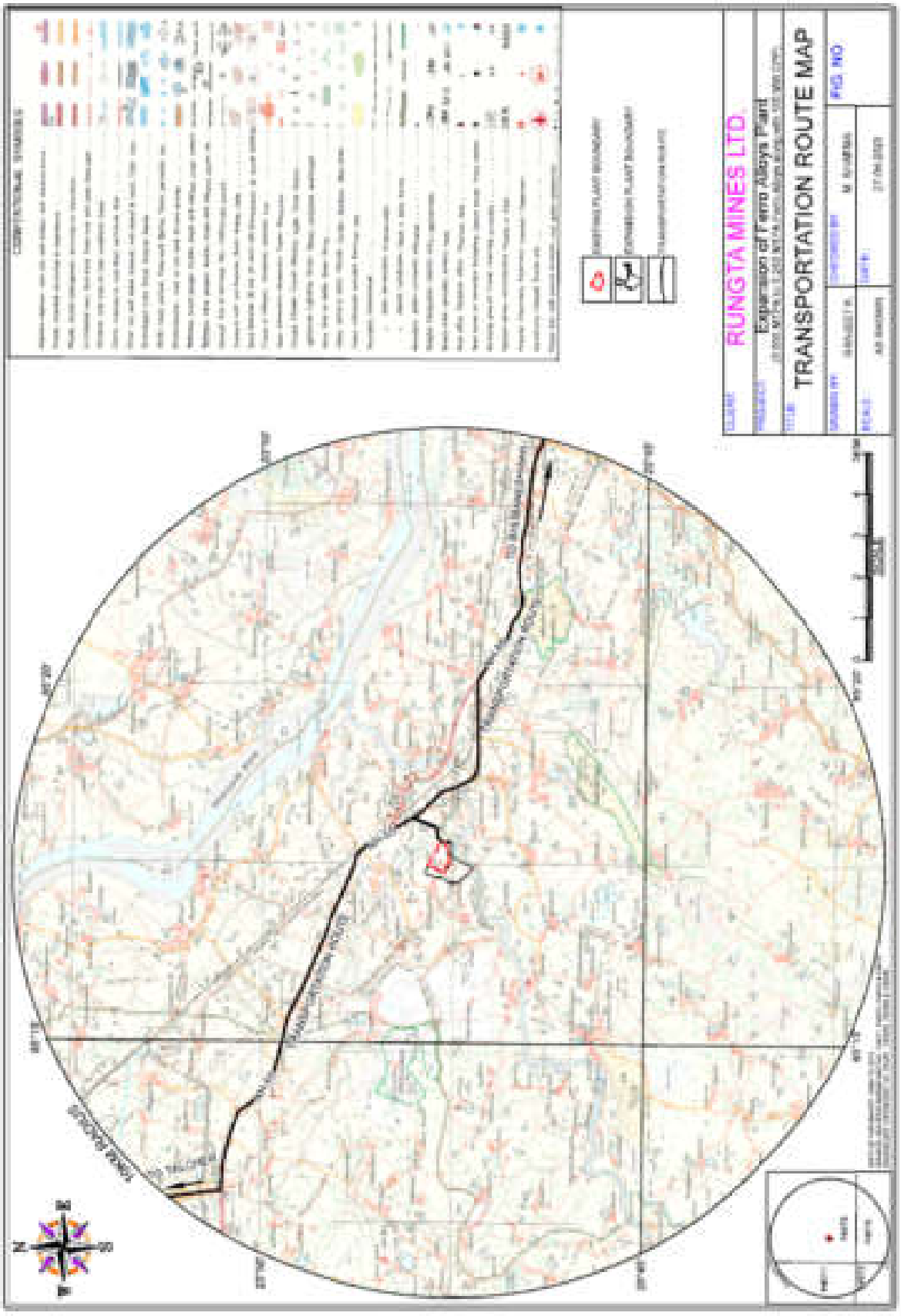
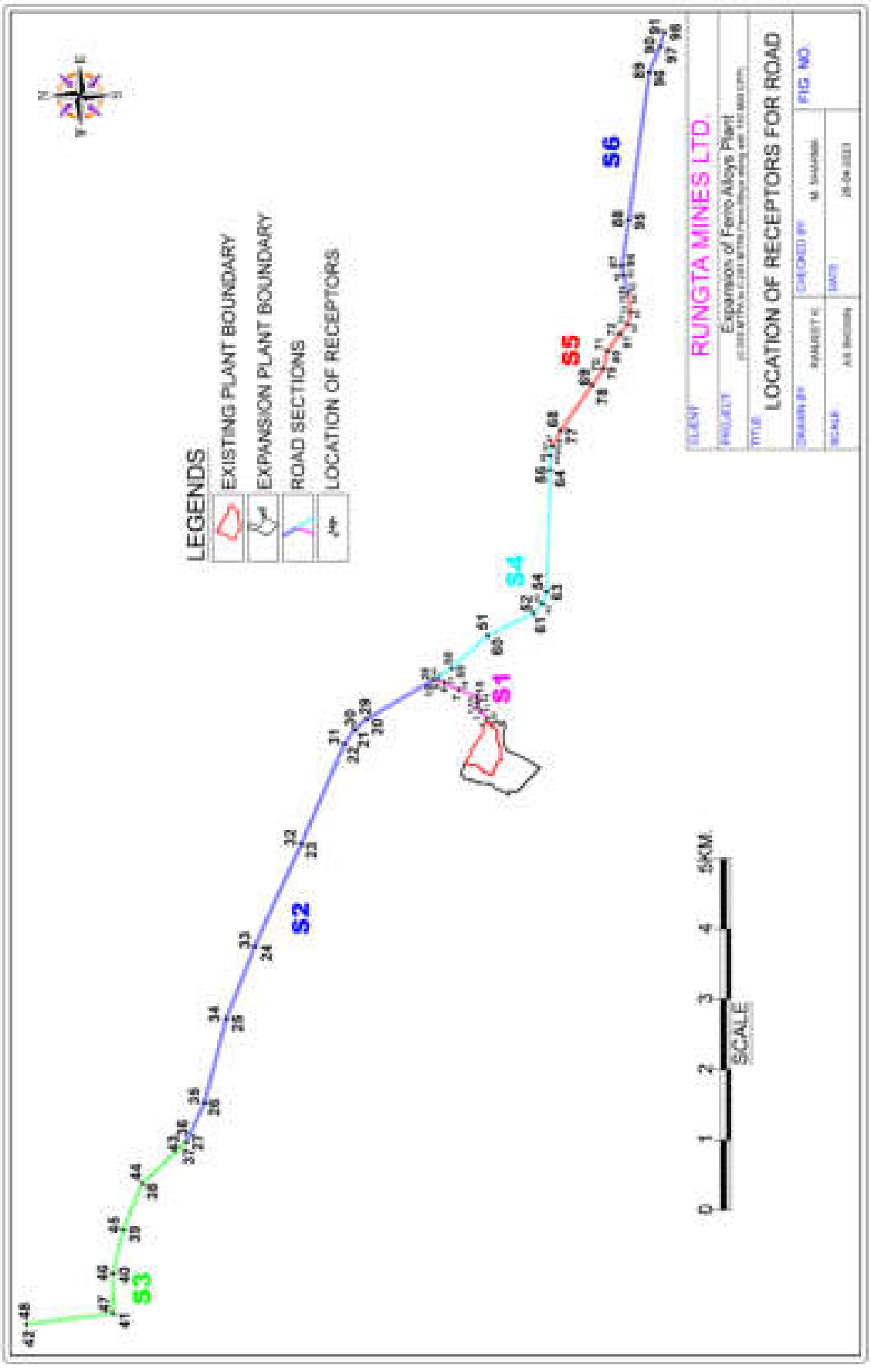


FIG 2 : SECTIONS OF TRANSPORTATION ROUTE AND RECEPTORS FOR MODELLING



SUMMARY OF MAXIMUM RESULTS FROM AIR QUALITY PREDICTION MODELLING

Pollutant	Maximum incremental GLC (µg/m^3)		
	Incremental GLC (µg/m^3)	Receptor No.	Section
PM_{10}	0.14	31	S02
$PM_{2.5}$	0.03	31	S02
SO_2	0.00	31	S02
NO_2	0.03	31	S02

Standards for Ambient air quality (MoEF Notification G.S. R 826(E) dated 16/11/2009)

Pollutants	Concentration of ambient air (All concentrations are micro g/m^3) for 24 hours average	
	Industrial area, Residential, Rural and Other areas	Ecologically sensitive area (Notified by Central Govt.)
Sulphur Dioxide (SO_2)	80	80
Oxides of Nitrogen as NO_2	80	80
Particulate Matter (size ≤10µm)	100	100
Particulate Matter (size ≤2.5µm)	60	60

BACKGROUND NOTES

Emissions from trucks as per norms

Emission standards for new heavy-duty engines—applicable as per Bharat Stage VI (applicable nation wide since 1st April 2020).

EU Emission Standards for Heavy-Duty Diesel Engines: Steady-State Testing

Stage	Date	Test	CO	HC	NOx	PM	PN	Smoke
			g/kWh				1/kWh	1/m
Euro IV	2005.1		1.5	0.46	3.5	0.02		0.5
Euro VI	**2013.01**	**WHSC**	**1.5**	**0.13**	**0.4**	**0.01**	**8.0×1011**	

a- PM = 0.13 g/kWh for engines < 0.75 dm3 swept volume per cylinder and a rated power speed > 3000 min-1

ANNEXURE : XIX

MINISTRY OF ENVIRONMENT, FORESTS AND CLIMATE CHANGE

NOTIFICATION

New Delhi, the 17th October, 2019

S.O. 3744(E).—In exercise of the powers conferred by clause (v) of sub-section (1) of section 12 and section 15 of the Environment (Protection) Act, 1986 (29 of 1986), read with rule 10(4) of the Environment (Protection) Rules, 1986, the Central Government hereby makes the following further amendments in the notification of the Government of India in the erstwhile Ministry of Environment and Forests, vide number S.O. 1547(E), dated the 14th July, 2006, namely:

In the said notification, in the Table,

(i) against serial numbers 3, 6, 7, 32, 33, 36, 37, 44, 46, 49, 57, 58, 65, 66, 94, 98, 105, 106, 107, 108, 110 and 112 the entries relating thereto, the following serial numbers and entries shall be substituted, namely:-

(1)	(2)	(3)	(4)
"3	M/s Bhagyanagar Sugars Ltd., 7-2-177, 4th & 5th Floors, Sri Sai Arcade, Begumpet, Hyderabad-500016, Telangana	(i) Mr. M.V. Raghavendra Rao (ii) Mr. K. Radha Krishna	17th October, 2019 to 16th October, 2024"
"6	M/s Jayshree Chemicals Ltd., Plot No. 762, Phase-III, GIDC Estate, Vapi-396195, Dist. Valsad	(i) Mr. T. Srinivasa Rao (ii) Mr. K. Murali Krishnudu (iii) Mr. C. Suresh	17th October, 2019 to 16th October, 2024"
"37	M/s Shantala Labs Pvt. Ltd., S. No. 1567, 2nd Floor, Mahadev Nagar, Mahalunge, Taluka Khed, Pune	(i) Dr. Vijaya M. Bhide (ii) Mr. Gaurav S. Kamdar (iii) Mr. L. Anjaneya	17th October, 2019 to 16th October, 2024"
"42	M/s Dabur International Plot No. 22, 9, Udyog Kendra Extn., Tronica City, Ghaziabad, Uttar Pradesh-201010, Uttar Pradesh	(i) Dr. Vipin Kumar (ii) Mr. Ravindra Pal Marwah (iii) Mrs. Manisha Srivastava	17th October, 2019 to 16th October, 2024"
"45	M/s Sinhgad Technical Education Society's Research Journal of Science and Technical Research Foundation, 121, University Road, Pune-411007	(i) Dr. V.K. Verma (ii) Dr. Jagdish Kumar (iii) Dr. Mukesh Gaur	17th October, 2019 to 16th October, 2024"
"55	M/s SGS India Pvt. Ltd., CIN: U74140MH2012PTC230669, Plot No. 4, Block-GP, Sector-V, Salt Lake Electronics Complex, Bidhannagar, Kolkata-700091, West Bengal	(i) Mr. Ajay Chetan Menon (ii) Mr. Manoj Roy (iii) Mr. Kallyan Bhanudas Jare	17th October, 2019 to 16th October, 2024"
"57	M/s Nectar Lifesciences Limited, Village Kharod, Taluka Kalol, Dist. Panchmahal, Kharod-382721, Gujarat	(i) Mr. Surendra Singh Kanwar (ii) Mr. Kaushik Bhupendrabhai Patel (iii) Ms. Sureeta Sharma Jaiswar	17th October, 2019 to 16th October, 2024"
"71	M/s Dr. Reddy's Laboratories Limited, Plot No. 137 & 138, Jeedimetla, Hyderabad, Telangana-500055, Telangana	(i) Dr. Medikonda Kondaiah (ii) Mr. Kambhampati Sreedhar (iii) Mr. T. Bhanu Murthy	17th October, 2019 to 16th October, 2024"
"89	M/s Hindustan Aeronautics Limited, "Nashik", Plot No. 96, Sector-21, Near Ozar (Airport), Ozar, Nashik-422207, Maharashtra	(i) Dr. Nandkishor T. Jadhav (ii) Mr. Kishor P. Pawar (iii) Mr. Ramesh B. Chandekar	17th October, 2019 to 16th October, 2024"
"93	M/s Shirke Construction Engineering Pvt. Ltd., Near Chinar Automotive, Solapur Road, Urali, 412308, Pune	(i) Dr. Tanveer Patrick (ii) Dr. Pallavi Vijaykumar Pravin	17th October, 2019 to 16th October, 2024"
"99	M/s Ambuja Cement Eastern Ltd., Plot No. 33, Road No. 8, Marol Industrial Area, Andheri (East), Mumbai-400059, Maharashtra	(i) Dr. Datta Vijaykrishnan Chirmuley (ii) Dr. Pallavi Sanjay Deshpande Chirmuley (iii) Mrs. Kavita Sanjeev Vyavahare	17th October, 2019 to 16th October, 2024"

ANNEXURE : XIX Contd..

"58	M/s Intramedical Testing Centre (Private Limited) Plot No. 80, Sector-44, Gurugram, Haryana - 122003, Haryana	(i) (ii) (iii)	Dr. Prakash Kaur Mr. Prem Kumar Mr. Sanjay Gupta	27th October,2019 Do 15th October, 2022"
"59	M/s Thiruvananthapuram Testing Laboratory Near Thycaud Junction, Pattom P.O, Thiruvananthapuram, Kerala - 695004, Kerala	(i) (ii) (iii)	Dr. K.P. Anthony Mrs. Suma Abraham Mr. Joby M.J.	7th September,2019 Do 15th October, 2022"
"60	M/s J.M. Environmental Pvt. Ltd. 124, Second Floor, Udyog Vihar Phase IV, Gurugram, Haryana - 122015	(i) (ii) (iii)	Mr. Surender Yadav Mr. Ajit Kumar Yadav Mr. Shashikant Yadav	7th September,2019 Do 15th October, 2022"
"61	M/s Mitti Manch Soil Laboratory A-131, Polytechnic Complex, IGNOU Road, New Delhi - 110030	(i) (ii) (iii)	Mr. R.K. Sharma Dr. Manisha Sharma Mr. Rahul Gupta	27th September,2019 Do 15th October, 2022"
"62	M/s Pragyan Environ Care Pvt. Ltd. C-8, 9 & 10, Parimal Industrial Estate-II, Opp. AMTZ, Iyyanki Village, Chowdavaram Mandal, Ahmedabad - 382415, Gujarat	(i) (ii)	Mr. Ajit Pratap Singh Mr. Mahesh Soni	7th September,2019 Do 15th October, 2022"
"63	M/s [illegible] Private Limited Khasra No. [illegible], Plot No. [illegible], Near [illegible], Village Kolhapur, Taluka Hatkanangale, Kolhapur - 416109, Maharashtra	(i) (ii) (iii)	Mr. Tushar Jagtap Mrs. Sonali Jayant Deshpande Dr. Nandkumar Vasantrao Kulkarni	7th September,2019 Do 15th October, 2022"
"64	M/s [illegible] Consultants Pvt. Ltd. Jawahar Road No. 2, Bhandup (East), Mumbai - 400042, Maharashtra	(i) (ii) (iii)	Mr. Jayant Kumar Modi Mr. Mukesh Sharma Mr. Om Prakash Singh	27th September,2019 Do 15th October, 2022"
"65	M/s Vishwas Environment Pvt. Ltd. Plot No. 23 & 24, Chandra Industrial Estate, Pathri Road, Sultanpur, Gurugram - 122001, Haryana	(i) (ii) (iii)	Mr. Rahul Mishra Mr. Yogesh Mohanty Mrs. Shashi Kant Pandey	27th September,2019 Do 15th October, 2022"
"66	M/s SGS India Test Services Private Limited No. 266/3, Thiruvottiyur High Road, Kaladipet, Thiruvottiyur, Chennai - 600019, Tamil Nadu	(i) (ii) (iii)	Dr. K. Vasanth Kumar Mr. R.T. Vijayakumar Mr. R. Jayaprasad	27th September,2019 Do 19th September, 2022"
"67	M/s Environ Veritas (India) Pvt. Ltd., No. 2, Thiru Vi Ka Industrial Estate, Phase II, Inner Ring Road, Guindy, Chennai - 600032, Tamil Nadu"	(i) (ii) (iii)	Mr. K. Ram Chandra Prasad Mr. M. Ramesh Mr. M. Kannan	27th September,2019 Do 15th October, 2022"

(ii) after serial number 178 and the entries relating thereto, the following serial numbers and entries shall be inserted, namely:-

(1)	(2)	(3)	(4)
"179	M/s Apex Analytical Research Lab Pvt. Ltd. C-127, Tawakkar Road Industrial Area, Delhi - 110033	(i) (ii) (iii)	Dr. Shiel Singh Smt. Jaswant Kaur Mr. Lalit Kumar Aggarwal	15th October,2019 Do 15th October, 202
180	M/s [illegible] Test House [illegible], Mohalla [illegible], [illegible] [illegible]	(i) (ii) (iii)	Mr. Vinod Tyagi Mr. Anoop Shukla Mr. [illegible]	15th October,2019 Do 15th October, 2022"
181	M/s Ayushi Centre for Acoustics & Research [illegible] Rajpur Kalan Campus, Sitamau, Mandsaur - 458775, Madhya	(i) (ii) (iii)	Dr. Sunil Kumar Dr. Shiv Nandan Mr. Vijay [illegible]	15th October,2019 Do 15th October, 2022"
182	M/s Calib Labs & Associates Pvt. Ltd., N-78, First Floor, Okhla Industrial Area, Phase-II, New Delhi - 110020	(i) (ii) (iii)	Mr. Jagmeet Singh Chawla Mr. Sunil Dutt Parmar Mr. Manish Ranjan	15th October,2019 Do 15th October, 2022"

ANNEXURE : XIX Contd..

593	M/s Centre for Environment Control Cloud Technology Pvt. Ltd T-8 & 21, Block-B, DLF Industrial Area, Moti Nagar, New Delhi-110015	1. 2. 3.	Mr. Pawan Singh Mr. Manoj Singh Ms. Suneeta Sharma	17th October, 2019 To 16th October, 2024
594	M/s Fast Green Solution Systems Pvt. Ltd. Plot A-30&31, Peenya Industrial Area, Nelagadaranahalli, Peenya, Bengaluru-560 058, Karnataka	1. 2. 3.	Mr. P.V. Hanumanth Rao Mr. S. Ravi Mrs. Amrutha Hanumant	17th October, 2019 To 16th October, 2024
595	M/s The Synergia Laboratory Private Limited D-62, Sector-6, Noida-201301, Uttar Pradesh	1. 2. 3.	Mrs. Sudhamini Sharma Mr. Rishi Sinha Mrs. Deepika Rai	17th October, 2019 To 16th October, 2024
596	M/s Environ Tech Technologies Unit No. 612, 6th Floor, JMD Megapolis Area, Sector-48, Sohna Road, Gurugram-Manesar, Gurgaon, Haryana	1. 2. 3.	Mr. Tarun Singh Mr. Amit Kundu Mrs. Mamta	17th October, 2019 To 16th October, 2024
597	M/s Global Environment & Mining Services 2nd Main Road, Basaveshwara Nagar, Bellary-583103, Bellary District, Karnataka	1. 2. 3.	Dr. Vasu Gupta Mrs. S. Shanmuga Priya Mr. G.R.C. Sekhar	17th October, 2019 To 16th October, 2024
598	M/s Greenlot Environtech Pvt. Ltd. 404, Commercial Complex, Sultanpur, Sohna Road, Gurugram, Haryana-122001, India	1. 2. 3.	Mr. Sudhakar Chandrashekhar Dhir Mr. Rahul Dattatraya Kulkarni, Technical Mr. Rekha Vasantbhai Dare	17th October, 2019 To 16th October, 2024
599	M/s Green Tech Lab Sr. No. 47/2/1, 2/1, 3/1, Kolhapur Tilak Nagar Road, Bajaj Hall, Pune-411033, Maharashtra	1. 2. 3.	Mrs. Sanchita Prashant Dhatrak Mrs. Sayali Manoj Joshi Mr. Vinay Ramchandra Lonkar	17th October, 2019 To 16th October, 2024
600	M/s Green Vision Testing & EMA Services Plot No. 21, First Floor, Annex-2, Thesil, Kanta Industrial Area, G.S.S. Road, Sikar-332001, Rajasthan	1. 2.	Mr. Umesh Kumar Sharma Mr. Mukesh Kumar Gupta	17th October, 2019 To 16th October, 2024
601	M/s Global Environ Laboratories Plot No. 1, Khasra No. 16, Opposite Street, Mumbai Delhi Highway, Industrial Area, Village Mukarampur, Muzaffarnagar-251001, Uttar Pradesh	1. 2. 3.	Mr. Arvind Kumar Srivastava Mr. Rishi Pandey Ms. Sweta Shukla	17th October, 2019 To 16th October, 2024
602	M/s Industrial Testing Centre Pvt. Ltd. Plot No. 5, Sy. No. 172/A, Industrial Estate, Patancheru, Sangareddy-502319, Telangana	1. 2. 3.	Mr. [illegible] Mr. Vijaya Kumar M. Mr. [illegible]	17th October, 2019 To 16th October, 2024
603	M/s [illegible] Survey No. 1078, Khasra No. [illegible], No. 1-2, Sector No. 5, New Panvel (East), Navi Mumbai-410206, Maharashtra	1. 2.	Mrs. Aravind Bhanu Mishra Mr. Raghavendra Chandrakant Naik	17th October, 2019 To 16th October, 2024
604	M/s Shatrunjaya Industrial Laboratory Private Limited Plot No. [illegible], Sector-[illegible], Phase-II, IIE, Sidcul, Haridwar, Uttarakhand-249403	1. 2. 3.	Dr. Shruthi A. Thimmaiah Mr. Sreekumar Nair J. Mr. Suresh Babu H.S.	17th October, 2019 To 16th October, 2024
605	M/s Nabtech Environ Services A-5, Mahaveer Industrial Area, Bagru, Jaipur-303007, Rajasthan	1. 2. 3.	Mr. Jagatchal Sharma Mrs. Meena Sharma Mr. Kamal Chand Nagar	17th October, 2019 To 16th October, 2024
606	M/s Nityam Consultancy A-19, Sector-5, Dhanna IT Park-411014, Pune, Maharashtra	1. 2. 3.	Mr. Ravindra Kumar Smt. Rekha Tiwari Mr. Ajay Sharma	17th October, 2019 To 16th October, 2024
607	M/s Enviro Lab Services 1st Floor, KSIA Building, Kaikondrahalli, Industrial Area Road, Bengaluru-560035, Karnataka	1. 2. 3.	Mr. Muniraju S.M. Mr. Dinesh S.M. Dr. Sandeep Kumar U.	17th October, 2019 To 16th October, 2024

708	M/s Shree Krishna Surgical Services A-504, Phase-II, Mayapuri Industrial Area, New Delhi-110064	(1) (2) (3)	Mr. Vinay Kumar Mr. Manohar Kumar Giri Mr. Sanjeet Das	17th October, 2019 To 16th October, 2021
709	M/s Spectra Analytical Instruments Limited S-1, PPP-II, Surajpur Industrial Area, Phase-V, Kasna, Greater Noida Gautam Budh Nagar Uttarakh	(1) (2) (3)	Mr. Nagesh Mu Mrs. Asha M L Mr. Naveen Kumar	17th October, 2019 To 16th October, 2021
710	M/s Trans Thane Creek Waste Management Association, F-226, T.T.C. Industrial Area, Near Datt Mandir, Shil Mahape Road Mahape, Navi Mumbai-400710	(1) (2) (3)	Dr. Smt. Ramchandra Kumar Dr. Smt. Sarita Shankar Mr. Tejas N Tripathi	17th October, 2019 To 16th October, 2021
711	M/s Mahindra Holidays Resorts India Ltd. Gut No.1008/2, 2nd Floor, Off Old Mumbai Mahindra Holidays & Resorts India Ltd., Sambodhi Inn, Bengaluru-560064, Karnataka	(1) (2) (3)	Mr. Rajalakshmi N S Mrs. Lakshmi Rao Mrs. Ajeeta Shenoy	17th October, 2019 To 16th October, 2021

[F. No. Q-15015/21/2017-CPW]

JAGMEET TAKHAR, Dy. Secy.

Note : The principal notification was published in the Gazette of India, Extraordinary, vide number S.O. 1742(E), dated the 13th July, 2016 and was last amended by notification No. S.O. 3208(E), dated the 20th September, 2019.

Published by the Controller of Publications, Delhi-110054.

ANNEXURE : XIX Contd..

National Accreditation Board for Testing and Calibration Laboratories

NABL

CERTIFICATE OF ACCREDITATION

MIN MEC R & D LABORATORY

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

A- 121, PARYAVARAN COMPLEX, IGNOU ROAD, NEW DELHI, DELHI, INDIA

in the field of

TESTING

Certificate Number: TC-6337

Issue Date: 17/03/2022 Valid Until: 16/03/2024

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Identity : Min Mec Consultancy Pvt. Ltd.

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

ANNEXURE : XX

FAX : 2562562/2560955
Tel. : 2560563/2532821
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E-mail : Paribesh@sancharnet.in
website : www.ospcboard.org

STATE POLLUTION CONTROL BOARD, ORISSA

(DEPARTMENT OF FOREST & ENVIRONMENT, GOVERNMENT OF ORISSA)
Paribesh Bhawan, A/118, Nilakanthanagar, Unit - VIII,
Bhubaneswar - 751 012, INDIA

No. 33614 / IND-II-NOC-3916 Date 08-11-05

BY SPEED POST.

OFFICE MEMORANDUM

In consideration of the application for obtaining consent to Establish for M/s. Mangilal Rungta (Ferro Alloys Plant) and clearance from the Collector, Dhenkanal vide letter No.632 dtd.25.10.2005, the State Pollution Control Board has been pleased to convey its consent to establish under section 25 of Water (Prevention & Control of Pollution) Act, 1974 & Sec.21 of Air (Prevention & Control of Pollution) Act, 1981 for manufacture / production of Ferro Manganese 4854 Tons/month, Silico Manganese 9330 MT/month at Tulsidhia PO: Maramundeli G.P: Motanga in the district of Dhenkanal with the following conditions.

GENERAL CONDITIONS:

1. This consent to establish is valid for the product, quantity manufacturing process and raw materials as mentioned in the application and for a period of five years from the date of issue of this letter, provided commencement of production of the proposed project has not taken place in the meantime.
2. If the proponent fails to start operation of the project but substantial physical progress has been made then a renewal of this consent shall be sought by the proponent.
3. If the proponent fails to initiate construction of the project and no significant physical progress is made then the proponent has to apply for consent to establish afresh after expiry of 5 years from the date of issue of this order.
4. Adequate effluent treatment facilities are to be provided such that the quality of sewage and trade effluent satisfies the standards as prescribed under Environment Protection Rule, 1986 or as prescribed by the Central Pollution Control Board and/or State Pollution Control Board or otherwise stipulated in the special conditions.
5. All emission from the industry as well as the ambient air quality and noise are to conform to the standards as laid down under Environment Protection Rule, 1986 or as prescribed by Central Pollution Control Board/State Pollution Control Board or otherwise stipulated in the special conditions.
6. Adequate method of disposal of solid waste is to be adopted to avoid environmental pollution.
7. The industry is to comply to the provisions of Environment Protection Act, 1986 and the rules made there under with their amendments from time to time such as the Hazardous Waste (Management & Handling) Rules, 1989, Hazardous Chemical Rules (Manufacture, Storage and Import of Hazardous Rules, 1989 etc. and amendment there under. The industry is also to comply to the provisions of Public Liability Insurance Act, 1991 if applicable.

Contd...

OPC Limited

/ 2 /

8. The industry is to apply for grant of consent to operate under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution) Act, 1981 at least 3 (three) months before the commercial production and obtain consent to operate from the board.
9. This consent to establish is subject to other statutory clearance from Government of Orissa and/or Government of India as and when applicable.

SPECIAL CONDITIONS:

1. The cooling water shall be completely recycled and shall not be discharged to outside under any circumstances. Periodical discharge of the cooling water shall be made on its own land inside the factory premises.
2. The domestic effluent shall be discharged to soak pit via septic tank constructed as per BIS specification
3. The Industry shall install fullfledged gas cleaning system (spark arrestors followed by Bag filters) and emission shall conform to the prescribed standard of 150 mg/Nm^3 for particulate matter.
4. The industry shall install proper dust extraction system and arrestors in the raw material handling section including briquetting plant.
5. The conveyors shall be covered and all the transfer points shall have dust extraction system.
6. There shall be separate energy meter for the Air Pollution Control system.
7. The wastewater generated in water screening plant shall be treated and used in plantation.
8. The height of the stack shall not be less than 45 meters from the ground
9. The unit shall provide portHole and platform at suitable location with safe approach to conduct emission monitoring at the stack.
10. The road inside the premises used for transportation shall be black topped.
11. The Industry shall provide pollution control measures for controlling the fugitive dust emission and the ambient air quality inside the factory premises shall conform to the National Ambient Air Quality standards with respect to SPM i.e. 500 µg/Nm^3
12. Solid waste shall be dumped inside the factory premises in such a manner to prevent ground water contamination and any public nuisance or used for road making. The water used for sluice granulation shall be completely recycled.
13. The DG set shall be installed in an acoustically designed enclosure to control noise level and over anti vibration pads to avoid vibration..
14. The height of the stack attached to the DG sets shall confirm to the following: H = h + 0.2 √KVA where h = Height of the building where it is installed, KVA = Capacity of the DG set, H = Height of the stack in meter above ground level.
15. The industry shall develop a green belt along its boundary and vacant areas available inside the premises.
16. The Board may impose further condition or modify the conditions also stipulated in this order during installation and/or at the time of obtaining consent to operate and may revoke this order in case the stipulated conditions are not implemented and/or information is found to have been suppressed / wrongly furnished in the application form.

Contd.... 3

ANNEXURE : XX Contd..

OPC Board

Continuation Sheet.....

17. The unit shall abide by the provisions of Environment (Protection) Act, 1986 and Rules amended there under.
18. The project proponent shall submit documents after conversion of land into industrial purpose while submitting application for consent to operate to the State Pollution Control Board.

MEMBER SECRETARY

To

Mr. Satish Kr. Sarma, Sr. Manager.
M/s. Mangilal Rungta,
At: Similipada, Near PTC Chowk,
Dist: Angul. Orissa.

Memo No. Dtd.

Copy forwarded to:

1. The Collector, Angul
2. District Industries Centre, Angul.
3. Director Factories & Boilers, Bhubaneswar
4. Regional Officer, SPC Board, Angul.
5. Env.Engineered.
6. Copy in Orang File

SR ENV.ENGINEER

ANNEXURE : XX Contd..

BY REGD POST

STATE POLLUTION CONTROL BOARD, ODISHA

(Department of Forest & Environment Govt of Odisha)
Paribesh Bhawan, A/118, Nilakanthanagar, Unit-VIII
Bhubaneswar – 751012

No. 11852 / Ind-II-NOC- 5744 Date 21.7.14 /

OFFICE MEMORANDUM

In consideration of the application for obtaining Consent to Establish M/s **Mangilall Rungta** the State Pollution Control Board has been pleased to convey its Consent to Establish under section 25 of Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 for installation of sinter plant (manganese) for manufacture/production of **manganese ore sinter of** quantity 3600 **TPM inside the exisiting premises of Ferroalloys plant of M/s Mangilall Rungta at Tulsidiha, Meramundali, Dist-Dhenkanal** with the following conditions.

GENERAL CONDITIONS.

1. **This Consent to establish is valid for the raw materials, product,** manufacturing **process and capacity mentioned** in the **application form.** This **order is valid for five years, which means the proponent shall commence construction of the project within a period of five years from the date of issue of this order. If the proponent** fails to do **substantial physical progress of the project within five years then a renewal of this consent to establish shall be sought by the proponent.**
2. Adequate effluent treatment facilities are to be provided such that the quality of sewage and trade effluent satisfies the standards as prescribed under Environment Protection Rule,1986 or as prescribed by the Central Pollution Control Board and/or State Pollution Control Board or otherwise stipulated in the special conditions.
3. All emission from the industry as well as the ambient air quality and noise shall conform to the standards as laid down under Environment (Protection) Act, 1986 or as prescribed by Central Pollution Control Board/State Pollution Control Board or otherwise stipulated in the special conditions.
4. Adequate method of disposal of solid waste is to be adopted to avoid environmental pollution.
5. The Industry shall comply to the provisions of Environment Protection Act, 1986 and the rules made there under with their amendments from time to time such as

the Hazardous Waste (Management, Handling & Transboundary Movement) Rules 2008, Hazardous Chemical Rules. /Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 etc. and amendments there under. The industry shall also comply with the provisions of Public Liability Insurance Act, 1991, if applicable

6. The industry shall apply for grant of Consent to operate under section 25/26 of Water(Prevention & Control of Pollution)Act, 1974 & Air (Prevention & Control of Pollution)Act, 1981 at least 3 (three) months before the commercial production and obtain Consent to Operate from this Board.

7. This consent to establish is subject to statutory and other clearances from Govt. of Odisha and/or Govt. of India, as and when applicable.

SPECIAL CONDITIONS : -

1. The proponent shall seek clarification from MoEF, Govt. of India regarding applicability of environmental clearance for sinter plant as per EIA notification, 2006.
2. The proponent shall install separate Gas Cleaning Plant (GCP) for treatment of flue gas of sinter plant and submit an undertaking to this effect before commencing construction activity for sinter plant.
3. The domestic effluent shall be discharged to soak pit via septic tank constructed as per BIS specification. Under no circumstances, there shall be any discharge of waste water outside the factory premises.
4. The Industry shall provide adequate pollution control measures for controlling the fugitive dust emission and the ambient air quality inside the factory premises shall conform to the National Ambient Air Quality Standards.
5. Solid waste in the form of slag and dust from APC devices shall be dumped inside the factory premises in a designated place in such a manner so that it does not contaminate surface run off and ground water or cause any public nuisance.
6. The green belt of the adequate width and density preferably with local species along the periphery of the plot shall be raised so as to provide protection against particulates and noise. It must be ensured that at least 33% of the total land area shall be under permanent green cover. The proponent shall ensure the maintenance of the green belt throughout the year and for all time to come. It is advised that they may engage professionals in this field for creation and maintenance of the green belt.
7. Rain water harvesting structure shall be constructed for utilizing the rain water collected from the roof of the administrative buildings for recharging the ground water within the premises as per the concept and practices prescribed by CPCB.
8. The civil construction shall be carried out with the fly ash bricks. If the fly ash bricks are not available locally the civil construction may carried out with other bricks with prior intimation to the concerned Regional Office of SPC Board. A

ANNEXURE : XX Contd..

quarterly statement indicating the use of fly ash bricks during civil construction shall be submitted to the Board for record

9. The unit shall abide by the provisions of Environment (Protection) Act, 1986 and rules framed thereunder.

10. The Board may impose further condition or modify the conditions as stipulated in this order during installation and / or at the time of obtaining consent to operate and may revoke this order in case the stipulated conditions are not implemented and / or information is found to have been suppressed / wrongly furnished in the application form..

SR.ENV. ENGINEER (N)

To

Sri S.N.Mishra.
Asst. Vice-President (Works)
M/s Mangilall Rungta (Ferro Alloys Division),
At-Tulasidiha, Meramandali
Dist-Dhenkanal-759121, Odisha.

Memo No._____/Dt._____/

Copy forwarded to:

1. Collector, Dhenkanal
2. District Industries Centre, Dhenkanal.
3. Director, Factories & Boiler, Bhubaneswar.
4. Regional Officer, S.P.C.Board, Angul,
5. Sr. Env. Scientist (PCP) SPC Board, Bhubaneswar.
6. DFO Dhenkanal.
7. Copy to Guard file/Consent to establish register

SR.ENV. ENGINEER -II

Tel : 2564033/2562924
EPABX: 2561809/2562847
E-mail: paribesh1@ospcboard.org
Web site: www.ospcboard.org

OFFICE OF THE
STATE POLLUTION CONTROL BOARD, ODISHA

PariveshBhawan, A/118, Nilakantha Nagar, Unit-VIII
Bhubaneswar - 751 012

By Speed Post/through online

No. 19793 / IND-II-CTE-6762 Date. 22-10-2022

AMENDED CONSENT TO ESTABLISH ORDER

1. Consent to Establish has been granted to M/s. Mangilla Rungta (Ferro Alloys Plant) vide letter No.33814, dtd. 22.11.2005 for manufacture/production of Ferro Manganese-4584 Metric Ton/Month and Silico Manganese-3330 Metric Ton/Month at Tulasidiha, PO. Meramundali, GP Motangaln in the district of Dhenkanal.

2. The Industry has installed and operating1x9 MVA Submerged Arc Furnace (SAF), 1x18 MVA Submerged Arc Furnace (SAF) for production Ferro Manganese-4584 MetricTon/Month and Silico Manganese-3330 Metric Ton/Month and a metal recovery plant (water zigging) of 25T/hr capacity for processing of slag.

3. M/s. Rungta Mines Limited (Ferro Alloys Division), At: Tulasidiha, PO. Meramundali, Dist: Dhenkanal has applied to the Board for amendment of Consent to Establish for change of production quantity of Ferro Manganese from 4584 Metric Ton/Month to 55008 Metric Ton/Annum and Silico Manganese from 3330 Metric Ton/Month to 39960 Metric Ton/Annum.

4. Request of M/s Rungta Mines Limited (Ferro Alloys Division) was placed before the Consent Committee in its meeting held on 25.09.2022.

In consideration of the online application **No.4321217** for Consent to Establish for M/s. **Rungta Mines Limited (Ferro Alloys Division)** the Board is pleased to convey its Consent to Establish under Section 25 of Water (Prevention & Control of Pollution) Act, 1974 and Section 21 of Air (Prevention & Control of Pollution) Act, 1981 for change in **production quantity of Ferro Manganese from 4584 Metric Ton/Month to 55008 Metric Ton/Annum and Silico Manganese from 3330 Metric Ton/Month to 39960 Metric Ton/Annum without any change in plant's existing configuration and without any change in production capacity within existing plant premises At: Tulasidiha, PO: Meramundali, in the district of Dhenkanal with following additional conditions.**

1. Concrete drain shall be constructed around the entire raw material handling area followed by surface runoff treatment system consisting of sedimentation through settling tanks/ cones in series followed by high rate clarification through clariflocculator / tube settlers to meet the

ANNEXURE : XX Contd..

discharge norms and shall be recycled / discharged specially during monsoon period in exigency.

2. Sensor based Dry fog type dust suppression system shall be provided at the raw material ground hopper area, transfer points and vibratory screen area to control fugitive emission.

3. The particulate matter emission in the stack attached to GCPs of SAFs shall meet prescribed standard of 100mg/Nm^3.

4. Pneumatic Dust Handling System shall be provided at both the bag filters hopper with Silo facility for mechanized handling of GCP dust from SAFs.

5. Industry shall Install Continuous Emission Monitoring System (CEMS) at both the stacks connected to GCPs of SAFs for Particulate Matter (PM) and real time monitoring data so generated shall be transmitted directly to RT-DAS server of the Board.

6. Industry shall install HD IP (Internet Protocol) surveillance cameras at suitable location to view emission from all the stacks and fugitive emission of the plant, having PAN, Tilt, Zoom (PTZ) with wiper facility and minimum 30X optical zoom. The camera shall support day & night operation with Infra-red cut filters, cover 400m or more distance. The camera must support latest network protocols, network security (password protection, IP address filtering, HTTPS encryption), 3rd party applications and supported with Network Security Certificate of NIST. This camera shall comply with international standards IEC 62262, IP66 with IK10 ratings or higher quality. Real Time Un-interrupted data from this online IP camera shall be connected with the Central Server of State Pollution Control Board, Odisha through IoT/GPRS device for data streaming and/or through dedicated lease line by the Industry. The industry shall make provisions at the site to store video streaming data of this camera for at least one month and facility for data migration to external devices.

All other stipulations in CTE Order issued vide Board letter No. 33614 dated 22.11.2006 shall remain unchanged.

MEMBER SECRETARY

To

The Director,
M/s. Rungta Mines Limited(Ferro Alloys Division),
At: Tulasidiha, PO: Meramundali,
Dist: Dhenkanal, Odisha-759121.

ANNEXURE : XX Contd..

Memo No. 19794 /Date 27.10.2022

Copy forwarded to:

1. The Collector & District Magistrate, Dhenkanal
2. The Director, Factories & Boiler, Bhubaneswar
3. The DFO, Dhenkanal
4. Consent to Operate Cell, SPC Board, BBSR
5. Hazardous Waste Management Cell, SPC Board, BBSR
6. The Regional Officer, SPC Board Angul
7. Copy to Guard file

ADDL. CHIEF ENV. ENGINEER

O/C

ANNEXURE : XX Contd..

Tel. 2564033/2563924
FAX: 2561808/2567847
E-mail. panbash1@ospcboard.org
Web site: www.ospcboard.org

OFFICE OF THE
STATE POLLUTION CONTROL BOARD, ODISHA

Paribesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII
Bhubaneswar - 751 012

By Speed Post/ through online

No. 19942 / IND-II-CTE-6761 Date. 28/10/2022

AMENDED CONSENT TO ESTABLISH ORDER

1. Consent to Establish has been granted to M/s. Mangilal Rungta vide letter No.11852, dtd.21.07.2014 for manufacture/production of Manganese Ore Sinter of quantity 3600TPM inside existing premises of Ferro alloys plant of M/s. Mangilal Rungta at Tulasdiha, PO: Meramundali, In the district of Dhenkanal.

2. Industry has installed Sinter Plant (Cast Iron Pan based Batch Process) inside existing premises of Ferroalloys Plant.

3. M/s. Rungta Mines Limited (Ferro Alloys Division), At: Tulasdiha, PO: Meramundali Dist: Dhenkanal has applied to the Board for amendment of Consent to Establish for change of production quantity of Manganese Ore Sinter from 3600 MT/Month to 43200 MT/Annum.

4. Request of M/s. Rungta Mines Limited (Ferro Alloys Division) was placed before the Consent Committee in its meeting held on 28.09.2022.

In consideration of the online application No.4316299 for Consent to Establish for M/s. **Rungta Mines Limited (Ferro Alloys Division)** the Board is pleased to convey its Consent to Establish under Section 25 of Water (Prevention & Control of Pollution) Act, 1974 and Section 21 of Air (Prevention & Control of Pollution) Act, 1981 for **revision in production quantity of Manganese Ore Sinter from 3600 MT/Month to 43200 MT/Annum without any change in plant's existing configuration and without any enhancement in production capacity** within existing plant premises, Ferroalloys plant of M/s. Rungta Mines Limited (Ferro Alloys Division), At: Tulasdiha, PO: Meramundali, In the district of **Dhenkanal** with following additional conditions.

1. Concrete drain shall be constructed around the entire raw material handling area followed by surface runoff treatment system consisting of sedimentation through settling tanks/ ponds in series followed by high rate clarification through clariflocculator / tube settlers shall be installed to meet the discharge norms and shall be recycled / discharged specially during monsoon period in exigency.

ANNEXURE : XX Contd..

2 Sensor based Dry fog type dust suppression system shall be provided at the raw materia, transfer points to control fugitive emission.

All other stipulations in CTE Order issued vide Board letter No. 11862 dated 21.07.2014 shall remain unchanged.

MEMBER SECRETARY

To

The Director,
M/s. Rungta Mines Limited (Ferro Alloys Division),
At: Tulsidiha, PO: Meramundali,
Dist: Dhenkanal, Odisha-759121.

Memo No. 19943 /Date 28.10.2022

Copy forwarded to:

1. The Collector & District Magistrate, Dhenkanal
2. The Director, Factories & Boiler, Bhubaneswar
3. The DFO, Dhenkanal
4. Consent to Operate Cell, SPC Board, BBSR
5. Hazardous Waste Management Cell, SPC Board, BBSR
6. The Regional Officer, SPC Board, Angul
7. Copy to Guard file

28/10/2022

ADDL. CHIEF ENV. ENGINEER

ANNEXURE : XXI

(This Document Contains ..... Pages)

BY REGD. POST/A/D

STATE POLLUTION CONTROL BOARD, ORISSA

A/118, Nilakantinagar, Unit – VI, Bhubaneswar – 751 012.

CONSENT ORDER

No. 5719 /SPCB(Bhsr) – 1 – IND (COR) – 5718 Dtd. 24-12-2008

Sub:- Consent for Existing / New operation of the plant under Section 21 of the Air (Prevention & Control of Pollution) Act 1981

Ref:- Your application No. **946** dtd. **24.11.2008**

CONSENT is hereby granted under Section 21 of the Air (Prevention & Control of Pollution) Act 1981 (Central Act 14 of 1981) hereinafter referred to as the Act and the rules and order made there under to ***M/s Mangilal Rungta (Ferro Alloys Division), Dhenkanal***, represented through its occupier ***Mr. Satish Kumar Sharma***, Designation ***A.G.M (comml.)***, Address ***Similipada, Angul*** (hereinafter referred to as "The Applicant") authorising him / her / them to operate his / her / their industrial plant in the Air Pollution Control Area as notified by the Government and to continue to make existing discharge of emissions / make new discharge of emissions from the stacks / chimneys.

This Consent is subject to the provisions of the Act and the rules and orders made there under and is further subject to the product quantity, specified chimney / stack discharge and quality of emissions as specified below. This consent is also subject to special condition, ambient air quality (Annexure – I) and General Conditions (Annexure – II).

The CONSENT is valid for the period up to **31.03.2012**.

A) **DETAILS OF PRODUCTS MANUFACTURED:**

Sl.No.	Description	Quantity
1.	***Ferro Manganese***	***4384 MT / Month***
2.	***Silico Manganese***	***5950 MT / Month***
3	-	-
4	-	-
5	-	-

Contd Pg.2

5: EMISSION IS PERMITTED THROUGH THE FOLLOWING CHIMNEYS / STACKS

Chimney / Stack No.	Description of Chimney / Stack.	Point of Discharge (Height)
1	*Stack attached to furnaces*	*45m.*
2	"	"
3	"	"
4	"	"
5	"	"

6) THE DAILY DISCHARGE OF EMISSIONS THROUGH THE FOLLOWING CHIMNEYS / STACKS SHALL NOT EXCEED THE FIGURES MENTIONED BELOW:

Sl No.	Chimney / Stack No.	Description of Chimney / Stack.	Maximum Discharge M^3/hour
1	*1*	*Stack Attached to Furnace*	*1,35,000*
2	"	"	"
3	"	"	"
4	"	"	"
5	"	"	"
6	"	"	"

D) THE EMISSION SHALL NOT CONTAIN CONSTITUENTS IN EXCESS OF THE TOLERANCE LIMITS AS LAID DOWN HERE UNDER.

Sl. No.	Parameters.	Unit	Limit prescribed. Chimney / Stack Number					
(1)	(2)	(3)	1	2	3	4	5	6
1	SO_2	"	"	"	"	"	"	"
2	CO	"	"	"	"	"	"	"
3	NOx	"	"	"	"	"	"	"
4	Particulate matter	*mg/Nm³*	*100*	"	"	"	"	"
5.	Others	"	"	"	"	"	"	"

Contd. Pg3

ANNEXURE : XXI Contd..

/63/

E) *SPECIAL CONDITIONS*:

01. The industry shall operate the gas cleaning system always to meet the prescribed standard for emission of 150mg/Nm^3 for particulate matter.
02. The industry shall provide proper dust extraction system in the raw material handling section.
03. The entire conveyor system shall be covered and all the transfer points shall have dust extraction system.
04. There shall be separate energy meter for the air pollution control system.
05. Porthole and platform at suitable location with safe approach shall be provided to conduct emission monitoring at the stack.
06. The entire internal roads shall be black topped / concreted.
07. The unit shall provide necessary pollution control measures for controlling the fugitive dust emission and the ambient air quality inside the factory premises shall conform to the National Ambient Air Quality standard with respect to suspended particulate matter i.e. 500 Microgram/m^3.
08. The DG set shall be installed in an acoustic ally designed enclosure to control noise level and over all vibration pace to avoid vibration.
09. The height of the stack attached to the DG set shall conform to the following.

$$H = h + 0.2 \sqrt{KVA}$$

Where H = Height of the stack in meter above ground level.
h = Height of the building in meter where DG set is installed
KVA = Capacity of DG Set

10. The industry shall develop a green belt along its boundary and plant trees in vacant areas available inside the premises.

To

The A.G.M. (Comm.)
M/s. Mangilall Rungta (Ferro Alloys Divn.)
5A- Express Tower,
42-A- Shakespeare Sarani
Kolkata – 700 017 (W.B)

MEMBER SECRETARY
STATE POLLUTION CONTROL BOARD, ORISSA.

Contd. Pg/4

ANNEXURE : XXI Contd..

/Ref/

Memo No:_____ Dtd. /Dtd. ... ...

1. Secretary, Department of Forest & Environment, Govt. of Orissa
2. Secretary Industries Department Govt. of Orissa.
3. Regional Officer, State Pollution Control Board, Angul
4. Cess Section (Head Office).
5. Guard File (Head Office)
6. H. S. M. Cell

SR.ENVIRENGINEER (C)
STATE POLLUTION CONTROL BOARD,ORISSA.

ANNEXURE - I

AMBIENT AIR QUALITY STANDARDS

Pollutant	Time Weighted Average	Concentration in Ambient Air			Method of Measurement
		Industrial Area	Residential Rural & Other	Sensitive Area	
1	2	3	4	5	6
Sulphur Dioxide (SO_2)	Annual Av.	60 µg/m³	50 µg/m³	15 µg/m³	1. Improve West and Gaeke method
	24 Hours	120 µg/m³	80 µg/m³	30 µg/m³	2. Ultraviolet flourescence
Oxides of Nitrogen as NO_2	Annual Av	60 µg/m³	50 µg/m³	15 µg/m³	1. Jacob & Hochheiser Modified (Na-Arsenite Method)
	24 Hours	120 µg/m³	80 µg/m³	30 µg/m³	2. Gas Phase Chemiluminescene
Suspended Particulate Matter (SPM)	Annual Av	360 µg/m³	140 µg/m³	70 µg/m³	
	24 Hours	500 µg/m³	200 µg/m³	100 µg/m³	Avg. flow rate not less than 1.1 m³/minute
Respirable Particulate Matter (Size less than 10 µm) (RPM)	Annual Avg	120 µg/m³	60 µg/m³	50 µg/m³	
	24 Hours	150 µg/m³	100 µg/m³	75 µg/m³	
Lead (Pb)	Annual Avg.	1.0 µg/m³	0.75 µg/m³	0.50 µg/m³	AAS Method after sampling using EPM 2000 or equivalent filter paper.
	24 Hours	1.5 µg/m³	1.0 µg/m³	0.75 µg/m³	
Carbon Monoxide (CO)	8 Hours	5.0 µg/m³	2.0 µg/m³	1.0 µg/m³	Non dispersive Infrared spectroscopy
	1 Hour	10.0 µg/m³	4.0 µg/m³	2.0 µg/m³	

* Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly / 8 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days

ANNEXURE - II

GENERAL CONDITIONS

1. The applicant shall provide port holes for sampling the emissions and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks and other sources of emissions so as to collect samples of emission by the Board or the applicant at any time in accordance with the provision of the Act or Rules made therein.

2. The applicant shall analyse the emissions every month for the parameters indicated in the No.4(a) and shall furnish in triplicate the report thereof to the Board by the 10th of the succeeding month.

3. This Consent is given by the Board in consideration of the particulars given in the application. Any change or alteration or deviation made in actual practice from the particulars furnished in the application will also be ground for review / variation / revocation of the Consent Order under Section 21 of the Act to make such deviations as deemed fit for the purpose of the Act.

4 The applicant shall not change or alter either the quality or quantity or rate of emission or install replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and / or quantity of emissions, without the previous written permission of the Board.

5. The applicant shall provide and maintain at his own cost one/two/three ambient air quality monitoring stations for monitoring Suspended Particulate Matter, Sulphor Dioxide, Oxides of Nitrogen, Hydro Carbon, Carbon-Monoxide and monitor the same once in a day/week/fortnight/ month. The data collected shall be maintained in a register and a monthly extract be furnished to the Board.

6. The applicant shall provide and maintain at his own cost a meteorological station to collect the data on wind velocity, direction, temperature, humidity, rainfall, etc. and the daily reading shall be recorded and the extract sent to the Board once in a month.

7. The applicant shall forward the following information to the Member Secretary State Pollution Control Board, Orissa, Bhubaneswar regularly before 10th of every month.

   (a) Progress on installation of air pollution control equipments.

   (b) Progress on the procurement and installation of equipments for monitoring ambient air quality, stacks/chimneys and meteorological data.

   (c) Monthly extract of daily discharge of emission through each chimney/stack.

Contd.Pg/2

(d) Report of analysis of stack monitoring, ambient air quality monitoring, meteorological data as required under conditions as serial 4 of Consent Order.

(e) Progress on planting of trees and plants as referred to under General Conditions No:4.

8. Any upset condition in any of the plant / plants of the factory which is likely to result in increased emissions and/or result in violation of the standards mentioned above shall be reported to the Headquarters and Regional Office of the Board telegraphically.

9 The applicant shall furnish to the Visiting Officer of the Board any information regarding the stack monitoring system/or operation of the plant or any other particulars as may be pertinent in preventing and controlling of pollution of Air.

10 The applicant shall submit process flow sheet and particulars of proposed control equipments monitoring equipments and time schedule for completing the installation of the same as to reach the Board within 30 days from the date of receipt of this consent.

11 The conditions imposed as above shall continue in force until revoked under Section 21 of the Act

12. The applicant shall make an application for grant of fresh consent atleast 90 days before the date of expiary of this consent orders.

13 The necessary fee as prescribed for obtaining consent, shall be paid for by the applicant along with the application for consent.

14 The industry shall immediately submit the revised application for consent to this Board in the event of any change in the quantity/quality of raw material, manufacturing process, rate of emissions, air pollution control equipments etc.

15. The applicant shall

(a) **Not later than 30 days** from the date of issue of this consent order certify in writing to the Member Secretary that the applicant has installed or provided for an alternate electric power source sufficient to operate all facilities installed by the applicant to maintain compliance with the terms and conditions of the consent.

(b) **Not later than** 30 days from the date of issue of this consent certify in writing to the Member Secretary that upon the reduction, loss or failure of one or more of the primary sources of electric power to any facilities installed by the applicant to maintain compliance with production and/or all emissions in order to maintain compliances with the terms and conditions of this consent.

Contd.Pg/3

16. No, Control equipments or chimney shall be altered or replaced or as the case may be erected or re-erected except with the previous approval of the Board.

17. The liquid effluent arising out of the operation of the air pollution control equipment shall be treated in the manner and to the satisfaction of standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act. 1974 (as ammended).

18 The solid waste such as sweeping, wastage packages, empty containers residues, sludge including that from air pollution control equipments collected within the premises of the industrial plants shall be disposed off scientifically to the satisfaction of the Board, so as not to cause fugitive emission, dust problems through leaching etc., of any kind.

19. The applicant shall plant a minimum of three varieties of trees at the density of not less than 1000 trees per acre. This plantation is situated over and above the bulk plantation of trees in that area and maintain them.

20 The applicant shall provide all facilities for collection of sample to the Board staff.

21. The stack monitoring system employed by the applicant shall be opened for inspection to this Board at any time.

22. There shall not be any fugitive or episodal discharge from the premises.

23. In case of such episodal discharge / emissions the industry shall take immediate action to bring down the emission within the limits prescribed by the Board in condition.

24. The applicant shall at all times maintain in good working order and operate as efficiently as possible all pollution control facilities to achieve the terms and conditions of the consent.

25. The issue of this consent does not convey any property right in either real or personal property or any exclusive previlleges nor does it authorise any injury to private property or any invasion of personal rights, or any infringment of Central, State laws or regulations.

26 The applicant shall keep the premises of the industrial plant and air pollution control equipments clean and make all hoods pipes, valves, stacks/chimneys leak proof The air pollution control equipments, location, inspection chambers, sampling port holes shall be made easily accessible at all times.

Contd.Pg/4

27. The applicant shall display this consent granted to him in a prominent place for the use of the inspecting officers of this Board.

28. An inception book shall be opened and made available to Board's Officers during their visit to the factory.

29. If due to any technological improvement or otherwise this Board is of opinion that after expiry of the conditions referred to above, requires variation pertaining the change of any control equipment either in nature or in part, this Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.

30. The applicant, his heir or legal representatives or assignees shall have no claim whatsoever to the condition or renewal of this consent after the expiry period of this consent.

31. The Board reserves the right to review, impose additional conditions or cancel or revoke change or alter the terms and conditions of this consent.

32. Any change in occupier shall be informed to the Board forthwith.

ANNEXURE : XXI Contd..

CONSENT ORDER
M/S RUNGTA MINES LIMITED (FERRO ALLOYS DIVISION)

BY REGD. POST WITH AD

STATE POLLUTION CONTROL BOARD, ODISHA

DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA
A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012
Phone-2581005, Fax: 2562622, 2589866 e-mail: pcbkesh1@orissapcb.org Website: www.orissapcb.org

CONSENT ORDER

No. 23810 / IND-I-CON-5716 Dt. 23-12-2022 /

CONSENT ORDER NO. 2306.

Sub : Consent for discharge of sewage and trade effluent under Section 25/26 of Water (PCP) Act, 1974 and emission under Section 21 of Air (PCP) Act, 1981 for operation of the plant.

Ref : Your online application **ID No.4462808, Dtd.01-11-2022 and your letter No.RML/FAD/CTO/22-23/137(A) dated 28-10-2022.**

Consent to operate is hereby granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and rules framed thereunder to;

Name of the Industry: **M/s Rungta Mines Limited (Ferro Alloys Division)**

Name of the Occupier & Designation **Shri Pradeep Kumar Chaturvedi, Director**

Address: **Vill: Tulasidiha, PO: Meramandali, Dist: Dhenkanal-759121, Odisha**

This consent order supersedes the earlier consent order issued vide Board's Letter No.4716, Dated 25.03.2022.

Details of Products Manufactured:

Sl. No.	Product	Quantity
1.	Ferro Manganese	55,008 TPA
2.	Silico Manganese	39,960 TPA

This consent order is valid for the period upto **31.03.2027.**

This consent order is valid for the specified outlets, discharge quantity and quality of effluents (ii) quantity of emission and its quality, specified chimney / stack (iii) quantity of solid waste and its disposal as specified below.

This consent is granted subject to the General and Special Conditions stipulated below:

CONSENT ORDER

M/S JOORJHA MEGASTEEL(I) LTD.(FERRO ALLOYS DIVISION)

A. Discharge permitted through the following outlet subject to the standard

Outlet No.	Description of outlet	Point of discharge	Quantity of discharge KLD or KL/hr	Prescribed Standard					
				–	–	–	–	–	–
01.	Cooling, other wastewater including metal recovery unit	Completely recycled	No discharge	–	–	–	–	–	–
02.	Domestic wastewater	Septic tank followed by soak pit	–			–	–	–	–

B. Emission permitted through the following stack subject to the prescribed standard

Chimney Stack No.	Description of Stack (Stack attached to)	Stack height (m) Above GL	Quantity of emission	Prescribed Standard	
				PM	SO_2 / NO_x
01	GCP of Furnace-I	45	55.000 m^3/hr	100 mg/Nm^3	– –
02	GCP of Furnace-II	45	18.400 m^3/hr	100 mg/Nm^3	-- –

C. Disposal of solid waste permitted in the following manner

Sl. No.	Type of Solid waste	Quantity generated	Quantity to be reused on site	Quantity to be reused off site	Quantity disposed off	Description of disposal site
01.	Slag	7,914 TPM	–	--	–	To be disposal at designated dump site
02.	Flue Dust from GCP	5 TPM	--		--	Used in briquette plant

CONSENT ORDER

M/S BINDAL MINES LIMITED (MINERAL DIVISION)

D. GENERAL CONDITIONS FOR ALL UNITS

1. The consent is given by the Board in consideration of the particulars given in the application. Any change or alteration or deviation made in actual practice from the particulars furnished in the application will also be the ground for liable to review/variation/revocation of the consent order under section 27 of the Water (Prevention & Control of Pollution) Act, 1974 and section 31 of Air (Prevention & Control of Pollution) Act, 1981 and to make such variations as deemed fit for the purpose of the Acts.
2. The occupier would immediately submit revised application for consent to operate to this Board in the event of any change in the quantity and quality of new materials / products / manufacturing process or quantity/quality of the effluent/ rate of emission/ air pollution control equipment / system etc.
3. The applicant shall not change or alter either the quality or quantity or the rate of discharge or temperature of the route of discharge without the previous written permission of the Board.
4. The application shall comply with and carry out the directions/orders issued by the Board in this consent order without any negligence or variation/ delay. In case of non-compliance of any or/and notices issued at any time and/or violation of the terms and conditions of this consent order, the applicant shall be liable for legal action as per the provisions of the Law.
5. The applicant shall make an application for grant of fresh consent at least 90 days before the date of expiry of this consent order.
6. The issuance of this consent does not convey any property right in either real or personal property or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State laws or regulations.
7. This consent does not authorize or approve the construction of any physical structure or facilities or the undertaking of any work in any natural water course.
8. The applicant shall display this consent granted to him in a prominent place for perusal of the public and Inspecting officers of this Board.
9. An inspection book shall be opened and made available in Board's Officers during the visit to the factory.
10. The applicant shall furnish to the visiting officer of the Board any information regarding the construction, installation or operation of the plant or of effluent treatment system / air pollution control system / waste incinerator system, any other particulars as may be required for processing and controlling pollution of Water / Air.
11. The applicant shall display suitable caution board at the place where the effluent is entering into any water body or any other place as directed by the Board, indicating clearly that the area into which the effluents are being discharged is not fit for the domestic use/bathing.
12. Storm water shall not be allowed to mix with the trade waste/ domestic effluent at the upstream of the terminal manholes where the flow measuring devices will be installed.
13. The applicant shall maintain good housekeeping both within the factory and the premises. All pipes, valves, sewers and drains shall be leak-proof. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas.
14. The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by him to conform with the terms and conditions of the consent.
15. Care shall be taken to keep the anaerobic lagoons damp, biologically active and not utilized as mere stagnation ponds. The anaerobic lagoons should be fed with the required nutrients for effective digestion. Lagoons should be constructed impervious.
16. The utilization of treated effluent on factory's own land, if any, should be controlled and there should be no possibility of the effluent gaining access into any drainage channel or other water courses either directly or by overflow.
17. The effluent disposal on land, if any, should be done without creating any nuisance to the surroundings or inundation of the lands at any time.
18. If at any time the disposal of treated effluent on land becomes incomplete or unsatisfactory or create any problem or becomes a matter of dispute, the occupier must adopt alternate satisfactory treatment and disposal measures.
19. The sludge from treatment units shall be taken in sludge drying beds and the dewatered liquid shall be taken to equalization tank.
20. The effluent treatment units and disposal measures shall become operative at the time of commencement of production.
21. The applicant shall provide pucca platform for sampling the ventilators and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks and other sources of emissions as are to be taken samples of emissions by the Board or the applicant at any time in accordance with the provisions of the Acts or Rules made therein.
22. The applicant shall provide all facilities and render requisite assistance to the Board's staff for collection of samples / stack monitoring / inspection.

CONSENT ORDER

23. The applicant shall not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and/or quantity of emissions, without the previous written permission of the Board.
24. No control equipments or chimney shall be altered or replaced or as the case may be erected or re-erected except with the previous approval of the Board.
25. The liquid effluent arising out of the operation of the air pollution control equipment shall be treated in the manner so as to meet the standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 (as amended).
26. The stack monitoring system employed by the applicant shall be disclosed for inspection to the Board at any time.
27. There shall not be any fugitive or episodical discharge from the premises.
28. In case of such episodical discharge/emission the occupier shall take immediate action to bring down the emission within the limits prescribed by the Board and stop the operation of the plant if required. Report of such accidental discharge/emission shall be brought to the notice of the Board within 24 hours of occurrence.
29. The applicant shall keep the premises and air pollution control equipments clean and make all roads, pipes, valves, stacks/chimneys leak proof. The air pollution control equipments, location, immediate surroundings, sampling port holes shall be made easily accessible at all times.
30. Any upset condition in any of the plants/units of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards mentioned shall be reported to the Head/Member Secretary/Regional Office of the Board by E-mail/FAX within 2 hours of its occurrence.
31. The occupier has to ensure that minimum three varieties of trees are planted at the density of not less than 1000 trees per acre. The trees may be planted along boundaries of the premises. This plantation is in progress over and above the existing plantation of trees in that area.
32. The solid waste such as sweeping, wastage packages, empty containers, residues, sludge including that from air pollution control equipments etc. have within the premises of the unit be disposed off scientifically to the satisfaction of the Board.
33. All solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board by:
i) Land filling in case of inert material (care should be taken that the material does not give rise to leachate which may percolate into ground water or carried away with storm run-off).
ii) Controlled incineration, wherever possible in case of combustible organic material.
iii) Composting, in case of biodegradable material.
34. Any toxic material shall be detoxified, if possible, otherwise be sealed in steel drums and buried in protected areas after obtaining approval of this Board in writing. The detoxification or sealing and burying shall be carried out in the presence of Board's authorised persons only. Letter of authorisation shall be obtained for handling and disposal of hazardous wastes.
35. If due to any technological improvement or otherwise this Board is of opinion that any of the conditions mentioned above requires variation (including the charges of any control equipment) either in whole or in part) this Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.
36. The applicant, its heirs/legal representatives or assignees shall have no claim whatsoever to the condition or renewal of this consent after the expiry period of this consent.
37. The Board reserves the right to review, impose additional conditions or condition, revoke, change or alter the terms and conditions of this consent.
38. Notwithstanding anything contained in the aforesaid letter of consent, the Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Act by the Board.
39. The conditions imposed as above shall continue to be in force until revoked under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and section 31 A of Air (Prevention & Control of Pollution) Act, 1981.
40. In case the consent fee is revised during this period, the occupier shall pay the differential fees to the Board for the remaining years to keep the consent order in force. If they fail to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.
41. The occupier shall comply with the conditions stipulated in CTE order issued by Odisha State Pollution Control Board and conditions stipulated in Environmental Clearances issued by MoEF&CC, Govt. of India.
42. The occupier shall abide by EP(P) Act, 1986 and Rules framed thereunder.
43. The Board reserves the right to revoke/refuse consent to operate at any time during period for which consent is granted in case any violation is observed and to modify/stipulate additional conditions as deemed appropriate.

CONSENT ORDER

GENERAL CONDITIONS FOR UNITS WITH INVESTMENT OF MORE THAN Rs.50 CRORES, AND 17 CATEGORIES OF HIGHLY POLLUTING INDUSTRIES (RED A)

1. The applicant shall analyse the effluent / emissions and Ambient Air Quality every month through approved laboratory for the parameters indicated in TABLE- 'B', 'C' & Part 'D' as mentioned in this order and shall furnish the report thereof to the Board on monthly basis.
2. The following information shall be furnished to the Member Secretary on or before 10th of every month.
   a) Performance / progress of the treatment plant.
   b) Monthly statement of daily discharge of domestic and/or trade effluent.
3. Non-compliance with effluent limitations
   a) If for any reason the applicant does not comply with or is unable to comply with any effluent limitations specified in this consent, the applicant shall immediately notify the consent issuing authority by telephone and provide the consent issuing authority with the following information in writing within 5 days of such notification.
      i) Causes of non-compliance
      ii) A description of the non-compliance discharge including its impact on the receiving waters.
      iii) Anticipated time of continuance of non-compliance if expected to continue or if such condition has been corrected the duration of period of non-compliance.
      iv) Steps taken by the applicant to reduce and eliminate the non-complying discharge and
      v) Steps to be taken by the applicant to prevent the condition of non-compliance.
   b) The applicant shall take all reasonable steps to minimize any adverse impact to natural waters resulting from non-compliance with any effluent limitation specified in this consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.
   c) Nothing in this consent shall be construed to relieve the applicant from civil or criminal penalties for non-compliance whether or not such non-compliance is due to factors beyond his control, such as breakdown, equipment failure, accident or natural disaster.
4. Proper housekeeping shall be maintained inside the factory premises including process areas by a dedicated team.
5. The occupier must constitute a team of responsible and technically qualified personnel who will ensure continuous operation of all pollution control devices round the clock (including night hours) and should be in a position to explain the status of operation of the pollution control measures to the inspecting officers of the Board at any point of time. The name of these persons with their contact telephone numbers shall be intimated to the concerned Regional Officer and Head Office of the Board and in case of any change in the team it shall be intimated to the Board immediately.
6. The occupier shall engage dedicated qualified manpower to ensure continuous and effective operation of online stack / Ambient Air Quality / Effluent monitoring stations for maintenance of database, real time data transfer to SPCB server, data analysis and co ordination with concerned personnel of process units for taking corrective measures in case of non-compliances and to respond to the instructions of SPCB in this matter.

CONSENT ORDER
M/S SURYA METALS LIMITED (FERRO ALLOYS DIVISION)

E. SPECIAL CONDITIONS:

1) The cooling & other wastewater including wastewater of metal recovery unit shall be completely recycled after adequate treatment and in no case there shall be discharge to outside.
2) Solid waste generated from the plant shall be dispose of inside the factory premises in such a manner that there shall not be any ground water contamination and cause any dust nuisance.
3) Solid waste such as slag shall be stored in a designated area inside the factory premises. Slag shall be used for road construction or filling of low laying area outside the factory premises.
4) The garland drains around slag dumping area followed by series of settling tanks provided to retain the solids carried away by runoff and washings shall be cleaned periodically and excavated materials shall be dumped in the dump yard.
5) The unit shall maintain and operate all the pollution control equipments properly so that the Particulate Matter Emission from the stacks attached to Furnace – & II shall not exceed the prescribed standard i.e. 100 mg/Nm^3.
6) The secondary fugitive emission generated during tapping shall be collected and discharged through GCP.
7) Chrome fine shall be stored in covered shed.
8) The unit should maintain proper housekeeping inside the plant premises specially in the raw material handling area.
9) System shall be in place to minimize fugitive dust emission from the raw material handling area.
10) All the internal roads shall be made black topped / concreted and shall be cleaned regularly to minimize fugitive emission.
11) A time bound action plan shall be furnished to carry out the following jobs:

    a) Concrete drains shall be constructed around raw material handling area and connected to a settling pond

b) Dry fog system shall be provided at raw material ground hopper, screens and vibratory screens.

c) Pneumatic dust handling system shall be provided at both the bag filters hopper with silo facility for mechanized handling of GCP dust from SAFs.

d) Housekeeping shall be improved at heat exchanger and bag filter of furnace areas.

12) The industry shall meet the ambient air quality inside the factory premises as annexed.

13) The height of the stack attached to DG set shall conform the followings .

H = h+0.2√KVA

h – Height of building where DG set is installed in meter

KVA = capacity of DG Set

H = Height of the stack in meter from ground level.

14) The industry shall develop a green belt along its boundary and plant trees in vacant areas available inside premises.

15) The industry shall construct a rainwater harvesting structure for utilization of the rain water collected from the roof top of all buildings and catchment area of the industry for recharging of ground water within the premises as per the concept and practices prescribed by CPCB.

16) The industry shall abide by all the provisions of E(P) Act, 1986 and rules framed thereunder.

17) The unit shall obtain authorization from the Board under the Hazardous & Other Wastes (Management and Transboundary Movement) Rules, 2016.

18) In case the consent fee is revised upwards during this period of consent the unit shall pay the differential amount to the Board (for the remaining years) to keep the consent order in force. If the industry fails to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.

CONSENT ORDER
M/S RUNGTA MINES LIMITED (FERRO ALLOYS DIVISION)

19) The Board reserves the right to revoke / refuse consent at any time during this period in case any violation is observed and modify / stipulate additional conditions as deemed appropriate.

To

The Director,
M/s Rungta Mines Limited (Ferro Alloys Division),
At: Tulasidiha, PO: Meramandali,
Dist: Dhenkanal-759121

CHIEF ENV. ENGINEER (M)
STATE POLLUTION CONTROL BOARD, ODISHA

Memo No _____/IDL_____/

Copy forwarded to :

i) Regional Officer, SPC Board, **Angul**
ii) District Collector, **Dhenkanal**
iii) DFO, **Dhenkanal**
iv) ACEE, H.S.M. Cell, (Head Office)
v) ACFS, Central Laboratory, SPC Board, Bhubaneswar
vi) Consent Register

ADDL. CHIEF ENV. ENGINEER
STATE POLLUTION CONTROL BOARD, ODISHA

CONSENT ORDER

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENT POLLUTANTS

Annexure-I

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENT POLLUTANTS PART – A : EFFLUENTS

Sl. No.	Parameters	Standards			
		Inland surface (a)	Public sewers (b)	Land for irrigation (c)	Marine Costal Areas (d)
1	Colour & odour	Colourless/ Odourless as far as practible	–	See 6 of Annex-1	See 6 of Annex-1
2	Suspended Solids (mg/l)	100	600	200	a. For process wastewater – 100 b. For cooling water effluent 10% above total suspended matter of influent.
3	Particular size of SS	Shall pass 850	--	–	
4.	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
5	Temperature	Shall not exceed 5°C above the receiving water temperature			Shall not exceed 5°C above the receiving water temperature
6.	Oil & Grease mg/l max.	10	20	10	20
7	Total residual chlorine	1.0	–		1.0
8.	Ammonical nitrogen (as N) mg/l max.	50	50	--	50
9.	Total Kajeldanl nitrogen (as NH_3) mg/1 max.	100			100
10.	Free ammonia (as NH_3) mg/l max	5.0	–	--	5.0
11.	Biochemical Oxygen Demand (5 days at (20°C) mg/1 max.	30	350	100	100
12.	Chemical Oxygen Demand mg/1 max.	250		--	250
13.	Arsenic (as As) mg/1 max.	0.2	0.2	0.2	0.2
14.	Mercury (as Hg) mg/1 max	0.01	0.01	–	0.001
15.	Lead (as pb) mg/1 max	0.1	1.0	–	2.0

CONSENT ORDER

M/S BIRLA COPPER (UNITED INDIA ALLOYS DIVISION)

Sl. No.	Parameters	Standards			
		Inland surface (a)	Public sewers (b)	Land for irrigation (c)	Marine Coastal Areas (d)
16.	Cadmium (as Cd) mg/l max.	2.0	1.0	–	2.0
17.	Hexavalent Chromium (as Cr + 6) mg/l max.	0.1	2.0	–	1.0
18.	Total Chromium (as Cr) mg/l max.	2.0	2.0	–	2.0
19.	Copper (as Cu) mg/l max.	3.0	3.0	–	3.0
20.	Zinc (as Zn) mg/l max.	5.0	15	–	15
21.	Selenium (as Se) mg/l max.	0.05	0.05	–	0.05
22.	Nickel (as Ni) mg/l max.	3.0	3.0	--	5.0
23.	Cyanide (as CN) mg/l max.	0.2	2.0	0.2	0.02
24.	Fluoride (as F) mg/l max.	2.0	15	–	15
25	Dissolved Phosphates (as P) mg/l max.	5.0	–	--	--
26.	Sulphide (as S) mg/l max.	2.0	–	–	5.0
27.	Phenolic compounds as (C_6H_5OH) mg/l max.	1.0	5.0	·	5.0
28.	Radioactive materials				
	a. Alpha emitter micro curie/ml.	10^{-7}	10^{-7}	10^{-8}	10^{-7}
	b. Beta emitter micro curie/ml.	10^{-6}	10^{-6}	10^{-7}	10^{-6}
29.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
30.	Manganese (as Mn)	2 mg/l	2 mg/l	–	2 mg/l
31.	Iron (Fe)	3 mg/l	3 mg/l	–	3 mg/l
32.	Vanadium (as V)	0.2 mg/l	0.2 mg/l	–	0.2 mg/l
33.	Nitrate Nitrogen	10 mg/l	–	–	20 mg/l

ANNEXURE : XXI Contd..

CONSENT ORDER

Annexure-II

NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutants	Time Weighted Average	Concentrate of Ambient Air		
			Industrial Residential, Rural and other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1.	Sulphur Dioxide (SO2), µg/m³	Annual *	50	20	- Improved west and Gaeke
		24 Hours **	80	80	- Ultraviolet fluorescence
2.	Nitrogen Dioxide (NO2), µg/m³	Annual *	40	30	- Modified Jacob & Hochheiser (Na-Arsenite)
		24 Hours **	80	80	- Chemiluminescence
3.	Particulate Matter (size less than 10µm) or PM10 µg/m³	Annual *	60	60	- Gravimetric - TOEM Beta Attenuation
		24 Hours **	100	100	
4.	Particulate Matter (size less than 2.5µm) or PM2.5 µg/m³	Annual *	40	40	- Gravimetric TOEM - Beta Attenuation
		24 Hours **	60	60	
5.	Ozone (O3) µg/m³	8 Hours **	100	100	- UV Photometric Chemiluminescence - Chemical Method
		1 Hours **	180	180	
6.	Lead (Pb) µg/m³	Annual *	0.50	0.50	AAS/ICP method after sampling on EMP 2000 or equivalent filter paper - ED-XRF using Teflon filter
		24 Hours **	1.0	1.0	
7.	Carbon Monoxide (CO) mg/m³	8 Hours **	02	02	- Non Dispersive Infra Red (NDIR) Spectroscopy Chemiluminescence - Indophenol Blue Method
		1 Hours **	04	04	
8.	Ammonia (NH3) µg/m³	Annual*	100	100	
		24 Hours **	400	400	
9	Benzene (C6H6) µg/m³	Annual *	05	05	-Gas Chromatography based continuous analyser - Adsorption and Desorption followed by GC analysis
10	Benzo (a) Pyrene (BaP)- Particulate phase only, ng/m³	Annual*	01	01	-Solvent extraction followed by HPLC/GC analysis
11.	Arsenic (As), ng/m³	Annual*	06	06	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m³	Annual*	20	20	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform interval.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the case in a year, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring

ANNEXURE : XXI Contd..

CONSENT ORDER
M/S RUNGTA MINES LIMITED (MANGANESE ORE SINTER PLANT)

BY REGD. POST WITH AD

STATE POLLUTION CONTROL BOARD, ODISHA

(DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA)
A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012
Phone-2567809, Fax: 2562927, Telegram e-mail: pcbbbsr1@ospcboard.org Website: www.ospcboard.org

CONSENT ORDER

No. 2750 / IND-I-CON-6825 Dt. 23.02.2023 /

CONSENT ORDER NO. 3004.

Sub : Consent for discharge of sewage and trade effluent under Section 25/26 of Water (PCP) Act, 1974 and emission under Section 21 of Air (PCP) Act, 1981 for operation of the plant.

Ref. Your online application **ID No.4625569, Dtd.04-01-2023 and online reply dated 20-02-2023.**

Consent to operate is hereby granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and rules framed thereunder to;

Name of the Industry: **M/s Rungta Mines Limited (Manganese Ore Sinter Plant)**

Name of the Occupier & Designation: **Shri Pradeep Kumar Chaturvedi, Director**

Address: **Vill: Tulasidiha, PO: Meramandali, Dist: Dhenkanal-759121, Odisha**

Details of Products Manufactured:

Sl. No.	Product	Quantity
1	Manganese Ore Sinter	43,200 TPA

This consent order is valid for the period from **01.04.2023 to 31.03.2024.**

This consent order is valid for the specified outlets, discharge quantity and quality of effluents (ii) quantity of emission and its quality, specified chimney / stack (iii) quantity of solid waste and its disposal as specified below.

This consent is granted subject to the General and Special Conditions stipulated below:

CONSENT ORDER

M/S BGR ENERGY SYSTEMS LIMITED (MANGANESE OREBENEFICIATION PLANT)

A. Discharge permitted through the following outlet subject to the standard

Outlet No.	Description of outlet	Point of discharge	Quantity of discharge KL/hr	Prescribed Standard			
				pH	TSS (mg/l)	Oil & Grease (mg/l)	BOD (mg/l)
01	Septic tank (Domestic effluent)	Soak pit	-	5.5-9.0	200	–	100

B. Emission permitted through the following stack subject to the prescribed standard

Chimney Stack No.	Description of Stack (Stack attached to)	Stack height (m) Above GL	Quantity of emission	Prescribed Standard		
				PM	SO_2	NO_x
C1	GCP of Sinter Plant	30	70,000 m^3/hr	100 mg/Nm^3	–	--

C. Disposal of solid waste permitted in the following manner

Sl. No.	Type of Solid waste	Quantity generated	Quantity to be reused on site	Quantity to be reused off site	Quantity disposed off	Description of disposal site
01.	Slag	–			--	To be disposed at designated dump site
02.	Flue Dust from GCP	–	--	--	--	Used in briquette plant

CONSENT ORDER

D. GENERAL CONDITIONS FOR ALL UNITS

1. The consent is given by the Board in consideration of the particulars given in the application. Any change or alteration or deviation made in actual practice from the particulars furnished in the application will make be the ground for cancellation/revocation of the consent order under section 27 of the Water (Prevention & Control of Pollution) Act, 1974 and section 31 of Air (Prevention & Control of Pollution) Act, 1981 and to make such variations as deemed fit for the purpose of the Acts
2. The occupier would immediately submit revised application for consent to operate to this Board in the event of any change in the quantity and quality of raw material / products / manufacturing process or quantity quality of the effluent rate of emission / air pollution control equipment / system etc.
3. The applicant shall not change or alter either the quality or quantity or the rate of discharge or temperature or the mode of discharge without the previous written permission of the Board.
4. The application shall comply with and carry out the directions/orders issued by the Board in this consent order without any negligence on his/her part. In case of non-compliance of any orders/directions issued at any time and/or violation of the terms and conditions of this consent order the applicant shall be liable for legal action as per the provisions of the law
5. The applicant shall make an application for grant of fresh consent at least 90 days before the date of expiry of this consent order.
6. The issuance of this consent does not convey any property right in either real or personal property or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State laws or regulation.
7. This consent does not authorize or approve the construction of any physical structure or facilities or the undertaking of any work in any natural water course
8. The applicant shall display this consent granted to him in a prominent place for perusal of the public and inspecting officers of the Board
9. An inspection book shall be opened and made available to Board's Officers during the visit to the factory.
10. The applicant shall furnish to the visiting officer of the Board any information regarding the production, installation or operation of the plant or of effluent treatment system / air pollution control system / ambient monitoring system or any other particulars as may be pertinent to preventing and controlling pollution of Water / Air
11. The applicant shall display suitable caution board at the place where the effluent is entering into any water-body or any other place to be indicated by the Board, indicating thereon that the area into which the effluents are being discharged is not fit for the consent s user/bathing.
12. Storm water shall not be allowed to mix with the trade and/or domestic effluent on the upstream of the terminal manholes where the flow measuring devices will be installed.
13. The applicant shall maintain good house-keeping both within the factory and the premises. All pipes, valves, sewers and drains shall be leak-proof. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas.
14. The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by him in accordance with the terms and conditions of the consent.
16. Care should be taken to keep the anaerobic lagoons, if any, biologically active and not utilized as mere stagnation ponds. The anaerobic lagoons should be fed with the required nutrients for effective digestion. Lagoons should be constructed impervious.
16. The utilization of treated effluent on factory's own land, if any, should be completed and there should be no possibility of the effluent getting access into any drainage channel or other water courses either directly or by run-off flow
17. The effluent disposal on land, if any, should be done without creating any nuisance to the surroundings or function of the lands or any type.
18. If at any time the disposal of treated effluent on land becomes incomplete or unsatisfactory or create any problem or becomes impossible of disposal, the occupier may adopt alternate satisfactory treatment and disposal measures.
19. The sludge from treatment units shall be dried in sludge drying beds and the drained liquid shall be taken to equalization tank.
20. The effluent treatment units and disposal measures shall become operational at the time of commencement of production
21. The applicant shall provide port holes for sampling the emissions and access platform for carrying out stack sampling and provide easily spill outlet points and other arrangements for stack/emissions and other sources of emissions so as to collect samples of emission by the Board or the applicant at any time in accordance with the provision of the Acts or Rules made thereon

CONSENT ORDER

M/S BHAVYA MISHRA METHANOL AND ORGANICS LTD. (UNIT-II) (ER 21477)

22. The applicant shall provide all facilities and render required assistance to the Board staff for collection of samples / stack monitoring / inspection.

23. The applicant shall not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw materials or manufacturing process resulting in any change in quality and/or quantity of emissions, without the previous written permission of the Board.

24. No cooling equipments or chimneys shall be attached or replaced or as the case may be erected or reerected except with the previous approval of the Board.

25. The liquid effluent arising out of the operation of the air pollution control equipment shall be treated in the manner so as to meet the standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 (as amended).

26. The stack monitoring system employed by the applicant shall be opened for inspection to the Board at any time.

27. There shall not be any fugitive or accidental discharge from the premises.

28. In case of such unwanted discharge/emissions the occupier shall take immediate action to bring down the emissions within the limits prescribed by the Board and stop the operation of the plant if required. Report of such accidental discharge/emission shall be brought to the notice of the Board within 24 hours of occurrence.

29. The applicant shall keep the premises and air pollution control equipments clean and make all vessels, pipes, valves, flanges/manways leak proof. The air pollution control equipments, location, representative chambers, sampling portholes shall be made easily accessible at all times.

30. Any upset condition in any of the plants/units of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards mentioned shall be reported to the Headquarters and Regional Office of the Board by E-mail within 2 hours of its occurrence.

31. The occupier has to ensure that minimum three varieties of trees are planted at the density of not less than 1000 trees per acre. The trees may be planted along boundaries of the premises. This plantation is in addition over and above the built plantation, if any, in the area.

32. The solid waste such as sweepings, wastage packages, empty containers, residues, sludge including that from air pollution control equipments collected within the premises of the plant be disposed of scientifically to the satisfaction of the Board.

33. All solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board by :

i) Land fill in case of inert material, care being taken to ensure that the material does not give rise to leachate which may percolate into ground water or carried away with storm run off.

ii) Controlled incineration with waste pose be in case of combustible organic material.

iii) Composting, in case of bio degradable material.

34. Any toxic materials shall be destroyed if possible, otherwise be sealed in steel drums and stored in protected areas after obtaining approval of the Board in writing. The destruction or sealing and burying shall be carried out in the presence of Board's authorized persons only. Letter of authorization shall be obtained by handling and disposal of hazardous wastes.

35. If due to any technological improvement or otherwise the Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any terminal equipment), either in whole or in part, the Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.

36. The applicant, his/her/its legal representatives or assignees shall have no claim whatsoever to the continuance or renewal of this consent after the expiry period of this consent.

37. The Board reserves the right to review, impose additional conditions or condition, revoke, change or alter the terms and conditions of this consent.

38. Notwithstanding anything contained in the conditional order of consent, the Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 to review any or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Act by the Board.

39. The conditions imposed as above shall cease to be in force until revoked under section 27(3) of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 A of Air (Prevention & Control of Pollution) Act, 1981.

40. In case the consent fee is revised during this period, the occupier shall pay the differential fees to the Board (for the remaining years) to keep the consent order in force. If they fail to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.

41. The occupier shall comply to the conditions stipulated in CTE order issued by Gujarat State Pollution Control Board and conditions stipulated in Environment Clearances issued by MoEF&CC, Govt. of India.

42. The occupier shall abide by E(P) Act, 1986 and Rules framed there under.

43. The Board reserves the right to revoke/refuse consent to operate at any time during period for which consent is granted in case any violation is observed and to modify/stipulate additional conditions as deemed appropriate.

ANNEXURE : XXI Contd..

CONSENT ORDER
WATER POLLUTION CONTROL ACT, 1974 AND AIR POLLUTION CONTROL ACT, 1981

GENERAL CONDITIONS FOR UNITS WITH INVESTMENT OF MORE THAN Rs.50 CRORES, AND 17 CATEGORIES OF HIGHLY POLLUTING INDUSTRIES (RED A)

1. The applicant shall analyse the effluent / emissions and Ambient Air Quality every month through approved laboratory for the parameters indicated in TABLE- 'B', 'C' & Part - 'F' as mentioned in this order and shall furnish the report thereof to the Board on monthly basis.
2. The following information shall be forwarded to the Member Secretary on or before 10th of every month.
   a) Performance / progress of the treatment plant.
   b) Monthly statement of daily discharge of domestic and/or trade effluent.
3. Non compliance with effluent limitations
   a) If for any reason the applicant does not comply with or is unable to comply with any effluent limitations specified in this consent, the applicant shall immediately notify the consent issuing authority by telephone and provide the consent issuing authority with the following information in writing within 5 days of such notification:
      i) Causes of non-compliance
      ii) A description of the non-compliance discharge including its impact on the receiving waters.
      iii) Anticipated time of continuance of non-compliance if expected to continue or if such condition has been corrected the duration or period of non-compliance
      iv) Steps taken by the applicant to reduce and eliminate the non complying discharge and
      v) Steps to be taken by the applicant too prevent the condition of non compliance
   b) The applicant shall take all reasonable steps to minimize any adverse impact to nature waters resulting from non-compliance with any effluent limitation specified in this consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non complying discharge.
   c) Nothing in this consent shall be construed to relieve the applicant from civil or criminal penalties for non compliance whether or not such non-compliance is due to factors beyond his control, such as break down, electric failure, accident or nature disaster.
4. Proper housekeeping shall be maintained inside the factory premises including process area by a dedicated team.
5. The occupier must constitute a team of responsible and technically qualified personnel who will ensure continuous operation of all pollution control devices round the clock (including night hours) and should be in a position to explain the status of operation of the pollution control measures to the inspecting officers of the Board at any point of time. The names of these persons with their contact telephone numbers shall be intimated to the concerned Regional Officer and Head Office of the Board and in case of any change in the team it shall be intimated to the Board immediately.
6. The occupier shall engage technical qualified manpower to ensure continuous and effective operation of online stack / ambient Air Quality / Effluent monitoring stations for maintenance of database, real time data transfer to SPCB server, data analysis and co-ordination with concerned personnel of process units for taking corrective measures in case of non-compliances and to respond to the instructions of SPCB in this matter.

CONSENT ORDER

E. SPECIAL CONDITIONS:

1) The process water, if any shall be completely recycled after adequate treatment and in no case there shall be discharge to outside.
2) The Surface Run-off generated from the factory premises shall be treated adequately to meet the prescribed standards (pH:5.5-9.0, TSS : 100 mg/l BOD:30 mg/l, COD:250 Mg/l, Oil & Grease: 10 mg/l). The treated run-off shall be utilized to the maximum extent and the surplus quantity shall be discharged to outside.
3) Solid waste generated from the plant shall be dispose of inside the factory premises in such a manner that there shall not be any ground water contamination and cause any dust nuisance.
4) Solid waste such as slag and dust from APC devices shall be stored in a designated area inside the factory premises. Slag shall be used for road construction or filling of low laying area outside the factory premises.
5) The garland drains around slag dumping area followed by series of settling tanks provided to retain the solids carried away by runoff and washings shall be cleaned periodically and excavated materials shall be dumped in the dump yard.
6) The GCP for treatment of flue gas of sinter plant shall be installed before commissioning of sinter plant. The commissioning of sinter plant with GCP shall be done in presence of Regional Officer, Angul.
7) The unit shall maintain and operate all the pollution control equipment properly so that the Particulate Matter Emission from the stacks attached to GCP of sinter plant shall not exceed the prescribed standard i.e. 100 mg/Nm^3.
8) Manganese ore fine shall be stored in covered shed.
9) The unit should maintain proper housekeeping inside the plant premises specially in the raw material handling area.
10) System shall be in place to minimize fugitive dust emission from the raw material handling area.
11) All the internal roads shall be made black topped / concreted and shall be cleaned regularly to minimize fugitive emission.
12) The following jobs shall be carried out in expedite manner:
    a) Concrete drains shall be constructed around raw material handling area and connected to a settling pond.
    b) Dry fog system shall be provided at raw material ground hopper, screens and vibratory screens.
13) The industry shall meet the ambient air quality inside the factory premises as annexed.
14) The height of the stack attached to DG set shall conform the followings:
    H = h+0.2√KVA
    h = Height of building where DG set is installed in meter
    KVA = capacity of DG Set
    H = Height of the stack in meter from ground level.

15) The industry shall develop a green belt along its boundary and plant trees in vacant areas available inside premises.

16) The industry shall construct a rainwater harvesting structure for utilization of the rainwater collected from the roof top of all buildings and catchment area of the industry for recharging of ground water within the premises as per the concept and practices prescribed by CPCB.

17) The industry shall abide by all the provisions of E(P) Act, 1986 and rules framed thereunder.

18) The unit shall obtain authorization from the Board under the Hazardous & Other Wastes (Management and Transboundary Movement) Rules, 2016.

19) In case the consent fee is revised upwards during this period of consent the unit shall pay the differential amount to the Board (for the remaining years) to keep the consent order in force. If the industry fails to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.

20) The Board reserves the right to revoke / refuse consent at any time during this period in case any violation is observed and modify / stipulate additional conditions as deemed appropriate.

To

The Director,
M/s Rungta Mines Limited (Manganese Ore Sinter Plant),
At: Tulasidiha, PO: Meramandali,
Dist: Dhenkanal-759121

CHIEF ENV. ENGINEER (M)
STATE POLLUTION CONTROL BOARD, ODISHA

Memo No. ...../Dt._____/

Copy forwarded to :

i) Regional Officer, SPC Board, Angul. He is requested to inspect the unit and conduct the air quality monitoring, soon after commissioning of the plant.
ii) District Collector, **Dhenkanal**
iii) DFO, **Dhenkanal**
iv) CLS, Central Laboratory, SPC Board, Bhubaneswar
v) ACEE, H.S.M. Cell, (Head Office)
vi) Consent Register

ADDL. CHIEF ENV. ENGINEER
STATE POLLUTION CONTROL BOARD, ODISHA

ANNEXURE : XXI Contd..

CONSENT ORDER

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENT POLLUTANTS PART – A : EFFLUENTS

Sl. No.	Parameters	Standards			
		Inland surface (a)	Public sewers (b)	Land for irrigation (c)	Marine Coastal Areas (d)
1.	Colour & odour	Colourless/ Odourless as far as practible	–	See 6 of Annex-1	See 6 of Annex-1
2.	Suspended Solids (mg/l)	100	600	200	a. For process wastewater – 100 b. For cooling water effluent 10% above total suspended matter of influent.
3.	Particular size of SS	Shall pass 850	--	--	--
4	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
5.	Temperature	Shall not exceed 5°C above the receiving water temperature	–	--	Shall not exceed 5°C above the receiving water temperature
6	Oil & Grease mg/l max.	10	20	10	20
7.	Total residue of Pesticide	1.0	–	–	1.0
8	Ammonical nitrogen (as N) mg/l max.	50	50	–	50
9.	Total Kjeldahl nitrogen (as NH_3) mg/l max	100	–	–	100
10	Free ammonia (as NH_3) mg/l max.	5.0		-	5.0
11.	Biochemical Oxygen Demand (5 days at 20°C) mg/l max.	30	350	100	100
12.	Chemical Oxygen Demand, mg/l max.	250	--	–	250
13.	Arsenic (as As) mg/l max.	0.2	0.2	0.2	0.2
14.	Mercury (as Hg) mg/l max.	0.01	0.01	--	0.001
15.	Lead (as pb) mg/l max	01.	1.0	--	2.0

CONSENT ORDER

Sl. No.	Parameters	Standards			
		Inland surface (a)	Public sewers (b)	Land for irrigation (c)	Marine Coastal Areas (d)
16.	Cadmium (as Cd) mg/l max.	2.0	1.0	—	2.0
17.	Hexavalent Chromium (as Cr + 6) mg/l max	0.1	2.0	—	1.0
18.	Total Chromium (as Cr) mg/l max	2.0	2.0		2.0
19.	Copper (as Cu) mg/l max.	3.0	3.0	—	3.0
20.	Zinc (as Zn) mg/l max.	5.0	15		15
21	Selenium (as Se) mg/l max.	0.05	0.05	—	0.05
22.	Nickel (as Ni) mg/l max.	3.0	3.0	--	5.0
23.	Cyanide (as CN) mg/l max.	0.2	2.0	0.2	0.02
24.	Fluoride (as F) mg/l max.	2.0	15	--	15
25	Dissolved Phosphates (as P) mg/l max.	5.0	-		
26	Sulphide (as S) mg/l max.	2.0	—	--	5.0
27	Phenolic compounds as (C_6H_5OH) mg/l max.	1.0	5.0	--	5.0
28.	Radioactive materials				
	a. Alpha emitter micro curie/ml.	10^{-7}	10^{-7}	10^{-8}	10^{-7}
	b. Beta emitter micro curie/ml	10^{-6}	10^{-6}	10^{-7}	10^{-6}
29	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
30.	Manganese (as Mn)	2 mg/l	2 mg/l		2 mg/l
31	Iron (Fe)	3 mg/l	3 mg/l		3 mg/l
32.	Vanadium (as V)	0.2 mg/l	0.2 mg/l	--	0.2 mg/l
33.	Nitrate Nitrogen	10 mg/l		--	20 mg/l

CONSENT ORDER

NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutants	Time Weighted Average	Concentration of Ambient Air: Industrial, Residential, Rural and other Area	Concentration of Ambient Air: Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1.	Sulphur Dioxide (SO_2), $\mu g/m^3$	Annual *	50	20	Improved west and Gaeke
		24 Hours **	80	30	Ultraviolet fluorescence
2.	Nitrogen Dioxide (NO_2), $\mu g/m^3$	Annual *	40	30	- Modified Jacob & Hochheiser (Na-Arsenite)
		24 Hours **	80	30	- Chemiluminescence.
3.	Particulate Matter (size less than 10µm) or PM10 µg/m³	Annual *	60	60	- Gravimetric TOEM
		24 Hours **	100	100	- Beta Attenuation
4.	Particulate Matter (size less than 2.5µm) or PM2.5 µg/m³	Annual *	40	40	Gravimetric TOEM
		24 Hours **	60	60	- Beta Attenuation
5.	Ozone (O_3) µg/m³	8 Hours **	100	100	- UV Photometric - Chemiluminescence
		1 Hours **	180	180	Chemical Method
6.	Lead (Pb) µg/m³	Annual *	0.50	0.50	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper.
		24 Hours **	1.0	1.0	ED XRF using Teflon filter
7.	Carbon Monoxide (CO) mg/m³	8 Hours **	02	02	- Non Dispersive Infra Red (NDIR)
		1 Hours **	04	04	Spectroscopy
8.	Ammonia (NH_3) µg/m³	Annual*	100	100	Chemiluminescence - Indophenol Blue Method
		24 Hours**	400	400	
9.	Benzene (C_6H_6) µg/m³	Annual *	05	05	Gas Chromatography based continuous analyser Adsorption and Desorption followed by GC analysis
10.	Benzo (a) Pyrene (BaP)- Particulate phase only, ng/m³	Annual*	01	01	Solvent extraction followed by HPLC/GC analysis
11.	Arsenic (As), ng/m³	Annual*	06	06	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12.	Nickel (Ni), mg/m³	Annual*	20	20	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform interval.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, it may exceed but not on two consecutive days of monitoring.

ANNEXURE : XXII

Rungta Mines Limited

(FERRO ALLOYS DIVISION)

Works : Vill :- Tulasidiha, P.O. :- Meramandali, Dist. :- Dhenkanal - 759121, ODISHA, INDIA
Phone : (06732) 258171, Fax : (06732) 258171 Email : fad@rungtamines.co.in

Ref: RML/FAD/CTO/22-23/230 Dated 28.03.2023

To,
Member Secretary,
Odisha State Pollution Control Board,
Paribesh Bhawan –A/118,
Bhubaneswar- 751012 (Odisha)

Sub: Submission of Compliance report for Ferro Alloys Plant located at Village-Tulasidiha, Post- Meramandali, District Dhenkanal, Odisha.

Ref: CTO letter no 23810/IND I CON/5718 dated 23 12 2022

Sir,

This has reference to the captioned subject and cited reference. we are herewith submitting the CTO compliance with respect to Rungta Mines Limited (Ferro Alloys Division) for your kind consideration

Thanking you,

Yours faithfully,
For Rungta Mines Limited
(Ferro Alloys Division)

P.K. Chaturvedi
Director.

Enclosed: As above

ANNEXURE : XXII Contd..

COMPLAINCE REPORT FOR CTO LETTER NO 23804/IND-I-CON-6825 DATED 23.12.2022

FOLLOWING FACILITIES IS UNDER OPERATION (FERRO ALLOYS DIVISION)

SL	Facilities	Production in TPA
1	Ferro Manganese	55008 MT/ Annum
2	Silico Manganese	39960 MT/ Annum

SL. No.	Conditions	Compliance
D.	**GENERAL CONDITIONS FOR ALL UNITS**	
1.	The consent is given by the Board in consideration of the particulars given in the application. Any change or alternation or deviation made in actual practice from the particulars furnished in the application will also be the ground for liable to review/variation/revocation of the consent order under section 27 of the Water (Prevention & Control of Pollution) Act, 1974 and Section 21 of Air (Prevention & Control of Pollution) Act, 1981 and to make such variations as deemed fit for the purpose of the Acts.	Yes we will submit revised application for consent to operate to this Board if any change in the quantity and quality of raw material/ and products/ manufacturing process or quantity/quality of the effluent rate of emission/air pollution control equipment/ systems etc.
2.	The occupier would immediately submit revised application for consent to operate to this Board in the event of any change in the quantity and quality of raw material / products / manufacturing process or quantity / quality of the effluent rate of emission / air pollution control equipment / system etc.	Ferro Alloys Division is operating 9 MVA and 18 MVA SAF
3.	The applicant shall not change or alter either the quality or quantity or the rate of discharge or temperature or the route of discharge without the previous written permission of the Board.	We will not change the quality or quantity or the rate of discharge or temperature or the route of discharge without the previous written permission of the Board.
4.	The application shall comply with and carry out the directives/orders issued by the Board in this consent order without any negligence on his/her part. In case of non-compliance of any order/directives issued at any time and/or violation of the terms and conditions of this consent order, the applicant shall be liable for legal action as per the provisions of the Law.	We follow all the directives/orders issued by the OSPCB/ CPCB
5.	The applicant shall make an application for grant of fresh consent at least 90 days before the date of expiry of this consent order.	This CTO is valid upto 31.03.2027
6.	The issuance of this consent does not convey any property right in either real or personal property or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal	Agreed

ANNEXURE : XXII Contd..

	rights, nor any infringement of Central, State laws or regulation.	
7.	This consent does not authorize or approve the construction of any physical structure or facilities or the undertaking of any work in any natural water course.	we have not constructed any work in natural water course
8.	The applicant shall display this consent granted to him in a prominent place for perusal of the public and inspecting officers of this Board.	Rungta Mines Limited (Ferro alloys Division) has been installed the Manual Board and also digital display board in a prominent place (at the Factory main Gate) for perusal of the public and also inspecting officer of the Board
9.	An inspection book shall be opened and made available to Board's Officers during their visit to the factory.	As per conditions, we have opened an inspection book which is available to Board's Officers during their visit to the factory.
10.	The applicant shall furnish to the visiting officer of the Board any information regarding the construction, installation or operation of the plant or of effluent treatment system / air pollution control system / stack monitoring system any other particulars as may be pertinent to preventing and controlling pollution of Water / Air.	We established a dedicated separate Environment Cell/Technical team and we will furnish to the visiting officer of the Board any information regarding the construction, installation or operation of the plant or effluent treatment system / air pollution control system / stack monitoring any other particulars
11.	The applicant shall display suitable caution board at the place where the effluent is entering into any water-body or any other place to be indicated by the Board, indicating therein that the area into which the effluents are being discharged is not fit for the domestic use/bathing.	Ferro Alloys division has installed caution board
12.	Storm water shall not be allowed to mix with the trade and/or domestic effluent on the upstream of the terminal manholes where the flow measuring devices will be installed.	We are not allowing storm water to mix with the trade and/or domestic effluent on the upstream of the terminal manholes where the flow measuring devices will be installed
13.	The applicant shall maintain good house - keeping both within the factory and the premises. All pipes, valves, sewers and drains shall be leak-proof. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas.	Ferro Alloys Division is maintaining good housekeeping within plant premises. All pipes, valves, sewers is leak proof

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14.	The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems install or used by him to achieve with the term(s) and conditions of the consent.	Ferro Alloys Division is maintaining good working order and operate as efficiently as possible. All treatment or control facilities or systems install or used by us to achieve with the term(s) and conditions of the consent
15.	Care should be taken to keep the anaerobic lagoons, if any, biologically active and not utilized as mere stagnation ponds. The anaerobic lagoons should be fed with the required nutrients for effective digestion. Lagoons should be constructed impervious.	Agreed
16.	The utilization of treated effluent on factory's own land, if any, should be completed and there should be no possibility of the effluent gaining access into any drainage channel or other water courses either directly or by overflow.	shall be complied
17.	The effluent disposal on land, if any, should be done without creating any nuisance to the surroundings or inundation of the lands at any time.	shall be complied
18.	If at any time the disposal of treated effluent on land becomes incomplete or unsatisfactory or create any problem or becomes a matter of dispute, the occupier must adopt alternate satisfactory treatment and disposal measures.	Surface runoff water from the plant area it being collected and stored in the reservoir
19.	The sludge from treatment units shall be dried in sludge drying beds and the drained liquid shall be taken to equalization tank.	shall be complied
20	The effluent treatment units and disposal measures shall become operative at the time of commencement of production.	shall be complied
21.	The applicant shall provide port holes for sampling the emissions and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks and other sources of emissions so as to collect samples of emission by the Board or the applicant at any time in accordance with the provision of the Act or Rules made therein.	Ferro Alloys Division has been provided all port holes for sampling the emissions and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks, and also have provided with designated number & facilitate identification.
22.	The applicant shall provide all facilities and render required assistance to the Board staff for collection of samples / stack monitoring/ inspection.	Ferro Alloys Division will provide the Skilled Assistance, who will help during collection of samples and also provide sampling ports with designed number & facilitate identification.

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23.	The applicant shall not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and/or quantity of emissions, without the previous written permission of the Board.	Agreed. Ferro Alloys Division will not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and/or quantity of emissions, without written permission from the Board.
24.	No control equipment or chimney shall be altered or replaced or as the case may be erected or re-erected except with the previous approval of the Board.	Agreed: Ferro Alloys Division will not replaced erected or re-erected without approval of the Board
25.	The liquid effluent arising out of the operation of the air pollution control equipment shall be treated in the manner so as to meet the standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 (as amended).	There is no effluent is being generated from the Air pollution system
26.	The stack monitoring system employed by the applicant shall be opened for inspection to this Board at any time.	Air Pollution Control (APC) system has been provided to all the dust generating points including fugitive dust from all vulnerable Fugitive emission is being monitored
27.	There shall not be any fugitive or episodal discharge from the premises.	Noted and Compliance Assured
28.	In case of such episodal discharge/ emissions the occupier shall take immediate action to bring down the emission within the limits prescribed by the Board and stop the operation of the plant if required. Report of such accidental discharge /emission shall be brought to the notice of the Board within 24 hours of occurrence.	Noted and Compliance Assured
29.	The applicant shall keep the premises and air pollution control equipment clean and make all hoods, pipes, valves, stacks/chimneys leak proof. The air pollution control equipment, location, inspection chambers, sampling port holes shall be made easily accessible at all times.	Ferro Alloys Division has been provided sampling facilities in all stacks. The air pollution control equipment, location, inspection chambers, sampling port holes has been made easily accessible at all times.
30.	Any upset condition in any of the plant/ plants of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards mentioned shall be	Ferro Alloys Division will reporte to the Headquarters and Regional Office of the Board through email within 24 hours if there is any upset

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	reported to the Headquarters and Regional Office of the Board by E-mail within 2 hours of its occurrence.	condition in the plant which is likely to result in increased effluent discharge/emission of air pollutants
31.	The occupier has to ensure that minimum three varieties of trees are planted at the density of not less than 1000 trees per acre. The trees may be planted along boundaries of the premises. This plantation is stipulated over and above the bulk plantation of trees in that area.	Total existing plant area is 52.525 acres out of which 17.33 acres green belt has been developed covering 17000 tress
32.	The solid waste such as sweeping, wastage packages, empty containers residues, sludge including that from air pollution control equipment collected within the premises of the shall be disposed off scientifically to the satisfaction of the Board.	Pneumatic Ash Handling system installed. Ferro Alloys Division has provided earthen bunds and garland drain around the solid waste
33.	All solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board by i) Land fill in case of inert material, care being taken to ensure that the material does not give rise to leachate which may percolate into ground water or carried away with storm run-off. ii) Controlled incineration, wherever possible in case of combustible organic material. iii) Composting, in case of bio-degradable material.	Noted Shall be Complied
34.	Any toxic material shall be detoxicated if possible, otherwise be sealed in steel drums and buried in protected areas after obtaining approval of this Board in writing. The detoxication or sealing and burying shall be carried out in the presence of Board's authorized persons only. Letter of authorization shall be obtained for handing and disposal of hazardous wastes.	Noted, Shall be Complied
35.	If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.	Agreed
36.	The applicant, his /heirs /legal representatives or assignees shall have no claim whatsoever to the condition or renewal of this consent after the expiry period of this consent.	Agreed

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37.	The Board reserves the right to review, impose additional conditions or condition, revoke change or alter the terms and conditions of this consent.	Agreed
38.	Notwithstanding anything contained in this conditional letter of consent, the Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Act by the Board.	Agreed
39.	The conditions imposed as above shall continue to be in force until revoked under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 A of Air (Prevention & Control of Pollution) Act, 1981	Agreed
40.	In case the consent fee is revised during this period, the occupier shall pay the differential fees to the Board (for the remaining years) to keep the consent order in force. If they fail to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.	Agreed
41.	The occupier shall comply to the conditions stipulated in CTE order issued by Odisha State Pollution Control Board and conditions stipulated in Environmental Clearances issued by MoEF & CC, Govt. of India.	is being complied
42.	The occupier shall abide by E(P) Act, 1986 and Rules framed there-under.	shall be complied if applicable
43.	The occupier reserves the right to revoke/ refuse consent to operate at any time during period for which consent is granted in case any violation is observed and to modify/ stipulate additional conditions as deemed appropriate.	Agreed
	GENERAL CONDITIONS FOR UNITS WITH INVESTMENT OF MORE THAN Rs. 50 CRORES, AND 17 CATEGORIES OF HIGHLY POLLUTING INDUSTRIES (RED A)	
1.	The applicant shall analyse the effluent / emissions and Ambient Air Quality every month through approved laboratory for the parameters indicated in TABLE- 'B', 'C' & Part -'B' as mentioned in this order and shall furnish the report thereof to the Board on monthly basis.	monthly Environmental Monitoring is being carried out by MOEF/ NABL accredited lab for ambient air , fugitive , Stack water Noise parameters
2.	The following information shall be forwarded to the Member Secretary on or before 10th of every month. a) Performance / progress of the treatment plant. b) Monthly statement of daily discharge of domestic and/or trade effluent.	is being complied

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3.	Non - compliance with effluent limitations a) If for any reason the applicant does not comply with or is unable to comply with any effluent limitations specified in this consent, the applicant shall immediately notify the consent issuing authority by telephone and provide the consent issuing authority with the following information in writing within 5 days of such notification. i) Causes of non-compliance. ii) A description of non-compliance discharge including its impact on the receiving waters. iii) Anticipated time of continuance of non-compliance if expected to continue or if such condition has been corrected the duration or period of non-compliance. iv) Steps taken by the applicant to reduce and eliminate the non-complying discharge and v) Steps to be taken by the applicant too prevent the condition of non-compliance. b) The applicant shall take all reasonable steps to minimize any adverse impact to natural waters resulting from non-compliance with any effluent limitation specified in this consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge. c) Nothing in this consent shall be construed to relieve the applicant from civil or criminal penalties for non-compliance whether or not such non-compliance is due to factors beyond his control, such as break-down, electric failure, accident or natural disaster.	No effluent is being generated from Plant
4.	d) Proper housekeeping shall be maintained inside the factory premises including process areas by a dedicated team.	Ferro Alloys Division has already provided the water tanker for water sprinkling and also dedicated housekeeping team. Ferro Alloys Division is maintaining good Housekeeping within the plant premises
5.	e) The occupier must constitute a team of responsible and technically qualified personnel who will ensure continuous operation of all pollution control devices round the clock (including night hours) and should be in a position to explain the status of operation of the pollution control measures to the inspecting officers of the Board at any point of time. The name of these persons with their contact telephone numbers shall be intimated to the concerned Regional Officer and	A Environment Management Cell has been in place at the project level as well as Head office level who is responsible for continuous operation of pollution control devices

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	Head Office of the Board and in case of any change in the team it shall be intimated to the Board immediately	
6.	The occupier shall engage dedicated qualified manpower to ensure continuous and effective operation of online stack / Ambient Air Quality / Effluent monitoring stations for maintenance of database, real time data transfer to SPCB server, data analysis and co-ordination with concerned personnel of process units for taking corrective measures in case of non-compliances and to respond to the instructions of SPCB in this matter.	Agreed, Unit has established the Environment Cell with qualified person at the project and company head quarter level for taking corrective measures in case of non-compliances and to respond to the instructions of SPCB in this matter.
E.	**SPECIAL CONDITIONS**	
1)	The process water, if any shall be completely recycled after adequate treatment and in no case there shall be discharge to outside.	No waste water is being discharged
2)	The Surface Run-off generated from the factory premises shall be treated adequately to meet the prescribed standards (pH:5.5-9.0, TSS: 100 mg/l, BOD:30 mg/l, COD:250 Mg/l, Oil & Grease: 10 mg/l). The treated run-off shall be utilized to the maximum extent and the surplus quantity shall be discharged to outside.	Surface runoff water from the plant area it being collected and stored in the reservoir
3)	Solid waste generated from the plant shall be dispose of inside the factory premises in such a manner that there shall not be any ground water contamination and cause any dust nuisance.	Slag generated from plant is being recovered from metal recovery plant
4)	Solid waste such as slag dust from APC devices shall be stored in a designated area inside the factory premises. Slag shall be used for road construction or filling of low laying area outside the factory premises.	is being complied
5)	The garland drains around slag dumping area followed by series of settling tanks provided to retain the solids carried away by runoff and washings shall be cleaned periodically and excavated materials shall be dumped in the dump yard.	The garland drains around slag dumping area is being constructed
6)	The GCP for treatment of flue gas of sinter plant shall be installed before commissioning of sinter plant. The commissioning of sinter plant with GCP shall be done in presence of Regional Officer, Angul.	Gas cleaning plant is installed
7)	The unit shall maintain and operate all the pollution control equipment's properly so that the Particulate Matter Emission from the stacks attached to GCP of sinter plant shall not exceed the prescribed standard i.e. 100 mg/Nm^3.	is being maintained
8)	Manganese ore fine shall be stored in covered shed.	Manganese ore fines is being stored in covered shed
9)	The unit should maintain proper housekeeping inside the plant premises specially in the raw material handling area.	proper housekeeping is maintained

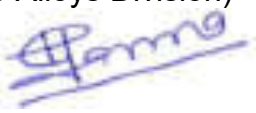
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10)	System shall be in place to minimize fugitive dust emission from the raw material handling area.	fugitive emission monitoring is being carried out by MOEF/NABL accredited agencies. All parameters are well within limits
11)	All the internal roads shall be made black topped / concreted and shall be cleaned regularly to minimize fugitive emission.	Internal Road is concreted
12)	A time bound action plan shall be furnished to carry out the following jobs: a) Concrete drains shall be constructed around raw material handling area and connected to a settling pond. b) Dry fog system shall be provided at raw material ground hopper, screens and vibratory screens.	Shall be complied
13)	The industry shall meet the ambient air quality inside the factory premises as annexed.	Ambient Air quality monitoring is being carried out by MOEF/NABL accredited lab at 4 locations. All parameters are well within limits.
14)	The height of the stack attached to DG set shall conform the followings : H = h+0.2 √KVA h = Height of building where DG set is installed in meter KVA = capacity of DG Set H = Height of the stack in meter from ground level.	Stack Height is as per CPCB guidelines
15)	The industry shall develop a green belt along its boundary and plant trees in vacant areas available inside premises.	Total existing plant area is 52.525 acres out of which 17.33 acres green belt has been developed covering 17000 tress
16)	The industry shall construct a rainwater harvesting structure for utilization of the rain water collected from the roof top of all buildings and catchment area of the industry for recharging of ground water within the premises as per the concept and practices prescribed by CPCB.	Rainwater harvesting structure for utilization of the rain water collected from the roof top of all building is under process
17)	The industry shall abide by all the provisions of E(P) Act, 1986 and rules framed thereunder.	Shall be complied if applicable
18)	The unit shall obtain authorization from the Board under the Hazardous & Other Wastes (Management and Transboundary Movement) Rules, 2016.	Hazardous waste authorisation granted by OSPCB vide letter no IND-IV-HW-724/5368 dated 31.03.2022
19)	In case the consent fee is revised upwards during this period of consent the unit shall pay the differential amount to the Board (for the remaining years) to keep the consent order in force. If the industry fails to pay	Agreed

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	the amount within the period stipulated by the Board the consent order will be revoked without prior notice.	
20)	The Board reserves the right to revoke/ refuse consent at any time during this period in case any violation is observed and modify / stipulate additional conditions as deemed appropriate.	Agreed

For Rungta Mines Limited
(Ferro Alloys Division)



G.P. Sharma
Addl General Manager (Env)

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CONSENT TO OPERATE COMPLIANCE PROGRESS REPORT

Project	**Manganese Ore Sinter Plant of M/s Rungta Mines Limited**
Consent Order No. and Date	**2750/ IND-I-CON-6825 Dt. 23.02.2023**

E.	GENERAL CONDITIONS FOR ALL UNITS	COMPLIANCE STATUS
1	The consent is given by the Board in consideration of the particulars given in the application. Any change or alteration or deviation made in actual practice from the particulars furnished in the application will also be the ground liable for review/ variation/ revocation of the consent order under section 27 of the Act of Water (Prevention & Control of Pollution) Act. 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 and to make such violations as deemed fir for the purpose of the Acts.	Noted
2.	The occupier would immediately submit revised application for consent to operate to this Board in the event of any change in the quantity and quality of raw material/ and products/ manufacturing process or quantity / quality of the effluent rate of emission / air pollution control equipment / systems etc.	Noted, Compliance Assured
3.	The application shall not change or alter either the quality or quantity or the rate of discharge or temperature or the route of discharge without the previous written permission of the Board.	Noted
4.	The application shall comply with and carry out the directives / orders issued by the Board in this consent order and at all subsequent times without any negligence on his part. In case of non-compliance of any order/ directives issued at any time and / or violation of the terms and conditions of this consent order, the applicant shall be liable for legal action as per the provisions of the Law.	Unit shall follow all the directives/orders issued by the OSPC Board
5.	The applicant shall make an application for grant of fresh consent at least 90 days before the date of expiry of this consent order.	Compliance Assured
6.	The issuance of this consent order does not convey any property right in either real or personal property or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State laws or regulation.	Noted
7.	This consent does not authorize or approve the construction of any physical structure or	Noted

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	facilities or the undertaking of any work in any natural water course.	
8.	The applicant shall display this consent granted to him in a prominent place for perusal of the public and inspecting officers of this Board.	Unit has been installed digital display board in a prominent place (at the Factory main Gate) for perusal of the public and also inspecting officer of the Board
9.	An inspection book shall be opened and made available to Board's Officers during their visit to the factory.	Unit have made separate inspection book it will be available to Board's whenever Officers comes their visit to the factory.
10.	The applicant shall furnish to the visiting officer of the Board any information regarding the construction, installation or operation of the plant or of effluent treatment system / air pollution control system / stack monitoring system any other particulars as may be pertinent to preventing and controlling pollution of Water / Air.	Unit shall be establish a dedicated separate Environment Cell/Technical team who has experienced about all plant condition
11.	The applicant shall display suitable caution board at the place where the effluent is entering into any water-body or any other place to be indicated by the Board, indicating therein that the area into which the effluents are being discharged is not fit for the domestic use/bathing.	Unit shall be made a separate line with specified color coding as per Rules.
12.	Storm water shall not be allowed to mix with the trade and/or domestic effluent on the upstream of the terminal manholes where the flow measuring devices will be installed.	Unit shall be made separate storm water line which will stored properly and the Flow meter will be install for the measurement.
13.	The applicant shall maintain good house-keeping both within the factory and the premises. All pipes, valves, sewers and drains shall be leak-proof. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas.	Unit maintaining good housekeeping all area as per requirement.
14.	The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems install or used by him to achieve with the term(s) and conditions of the consent.	Compliance Assured
15.	Care should be taken to keep the anaerobic lagoons, if any, biologically active and not utilized as mere stagnation ponds. The anaerobic lagoons should be fed with the required nutrients for effective digestion. Lagoons should be constructed	Compliance Assured
16.	The utilization of treated effluent on factory's own land, if any, should be completed and	Cooling water from Ferro alloys plant is completely recycled

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	there should be no possibility of the effluent gaining access into any drainage channel or other water courses either directly or by overflow.	
17.	The effluent disposal on land, if any, should be done without creating any nuisance to the surroundings or inundation of the lands at any time.	Noted
18.	If at any time the disposal of treated effluent on land becomes incomplete or unsatisfactory or create any problem or becomes a matter of dispute, the occupier must adopt alternate satisfactory treatment and disposal measures.	No effluent is being generated. Domestic effluent generated is being discharged to soak pit via septic tanks
19.	The sludge from treatment units shall be dried in sludge drying beds and the drained liquid shall be taken to equalization tank	Unit shall be complied
20.	The effluent treatment units and disposal measures shall become operative at the time of commencement of production.	No effluent is being generated. Domestic effluent generated is being discharged to soak pit via septic tanks
21.	The applicant shall provide port holes for sampling the emissions and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks and other sources of emissions so as to collect samples of emission by the Board or the applicant at any time in accordance with the provision of the Act or Rules made therein.	Unit have provided all port holes for sampling the emissions and access platform for carrying out stack monitoring sampling
22.	The applicant shall provide all facilities and render required assistance to the Board staff for collection of samples / stack monitoring / inspection.	Agreed
23.	The applicant shall not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and/or quantity of emissions, without the previous written permission of the Board.	Noted
24.	No control equipment or chimney shall be altered or replaced or as the case may be erected or re-erected except with the previous approval of the Board.	Agreed
25.	The liquid effluent arising out of the operation of the air pollution control equipment shall be	Waste water generated from MRP is being settled in the concrete 2 no’s settling tanks as

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	treated in the manner to the meet the prescribed standards by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 (as amended).	well as cooling water is completely recycled. Domestic effluent is being discharged to soak pit via septic tank
26.	The stack monitoring system installed by the applicant shall be opened for inspection to this Board at any time.	Online Continuous Emission monitoring systems (CEMS) for stack facilities have been provided for 24 X 7 hrs. and it connected with SPCB & CPCB server.
27.	There shall not be any fugitive or episodal discharge from the premises.	Agreed, Air Pollution Control (APC) system provided for all the dust generating points in Ferro alloys plant and sinter plant
28.	In case of such episodal discharge/emissions the occupier shall take immediate action to bring down the emission within the limits prescribed by the Board in conditions/stop the operation of the plant. Report of such accidental discharge/ emission shall be brought to the notice of the Board within 24 hours of occurrence.	Noted and Compliance Assured.
29	The applicant shall keep the premises of the and air pollution control equipment clean and make all hoods, pipes, valves, stacks/chimneys leak proof. The air pollution control equipment, location, inspection chambers, sampling port holes shall be made easily accessible at all times.	Unit has been installed the standard ladder for accessing port hole and also safe Zigzag ladder with cage has been provide APCM devices along with structure location in easily accessible at all times.
30.	Any upset condition in any of the plant/plants of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards mentioned above shall be reported to the Headquarters and Regional Office of the Board by email within 2 hours of the occurrence.	Noted, Unit shall be inform to Board any of the plant/plants of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards
31.	The Occupier has to ensure that minimum three varieties of trees are planted at the density of not less than 1000 trees per acre. The trees may be planted along boundaries of the industries or industrial premises. This plantation is stipulated over and above the bulk plantation of trees in that area.	Total existing plant area is 52.525 acres out of which 17.33 acres green belt developed, which is 33% of the plant area.
32.	The solid waste such as sweeping, wastage packages, empty containers residues, sludge including that from air pollution control equipment collected within the premises shall be disposed off scientifically to the satisfaction of the Board	Unit has been installed the pneumatic Ash Handling system and Silo for controlling the emission
33.	All solid wastes arising in the premises shall	Noted Shall be Complied.

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	be properly classified and disposed off to the satisfaction of the Board by : i) Land fill in case of inert material, care being taken to ensure that the material does not give rise to leachate which may percolate into ground water or carried away with storm run-off. ii) Controlled incineration, wherever possible in case of combustible organic material. iii) Composting, in case of bio-degradable material.	
34.	Any toxic material shall be detoxicated if possible, otherwise be sealed in steel drums and buried in protected areas after obtaining approval of this Board in writing. The detoxication or sealing and burying shall be carried out in the presence of Board's authorized persons only. Letter of authorization shall be obtained for handling and disposal of hazardous wastes.	Noted, Shall be Complied
35.	If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.	Agreed
36.	The applicant, his/heirs/legal representatives or assignees shall have no claim whatsoever to the condition or renewal of this consent after the expiry period of this consent.	Agreed
37.	The Board reserves the right to review, impose additional conditions or condition, revoke change or alter the terms and conditions of this consent.	Noted
38.	Notwithstanding anything contained in this conditional letter of consent, the Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Act by the Board.	Noted
39.	The conditions imposed as above shall	Noted

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	continue to be in force until revoked under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 A of Air (Prevention & Control of Pollution) Act, 1981.	
40	In case the consent fee is revised upward or the fees paid is found to be inadequate for any reason during this period, the industry shall pay the differential fees to the Board (for the remaining years) to keep the consent order in force. If they fail to pay the adequate amount within the period stipulated by the Board the consent order will be revoked without prior notice.	Noted
41.	The Occupier shall comply to the conditions stipulated in CTE order issued by ODISHA State Pollution Control Board and conditions stipulated in Environmental Clearances issued by MoEF, Govt of India.	Complied
42.	The occupier shall abide by E(P) Act, 1986 and Rules framed there-under.	Noted
43.	The Board reserves the right to revoke/refuse consent to operate at any time during period for which consent is granted in case any violation is observed and to modify/ stipulate additional conditions as deemed appropriate.	Noted
	GENERAL CONDITIONS FOR UNITS WITH INVESTMENT OF MORE THAN Rs 50 CRORES, AND 17 CATEGORIES OF HIGHLY POLLUTING INDUSTRIES (RED A).	
1.	The applicant shall analyze the effluent / emissions and Ambient Air Quality every month through approved laboratory for the parameters indicated in TABLE- 'B', 'C' & Part -'B' as mentioned in this order and shall furnish the report thereof to the Board on monthly basis.	AAQ monitoring, Noise GW is being carried out by MOEF&NABL accredited lab
2.	The following information shall be forwarded to the Member Secretary on or before 10th of every month. (a) Performance / progress of the treatment plant. (b) Monthly statement of daily discharge of domestic and/or trade effluent.	No effluent is being generated
3.	Non-compliance with effluent limitations	
(a)	If for any reason the applicant does not comply with or is unable to comply with any effluent limitations specified in this consent, the applicant shall immediately notify the consent issuing authority by telephone and provide the consent issuing authority with the	Noted Compliance shall be assured

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	following information in writing within 5 days of such notification. i) Causes of non-compliance ii) A description of the non-compliance discharge including its impact on the receiving waters. iii) Anticipated time of continuance of non-compliance if expected to continue or if such condition has been corrected the duration or period of non-compliance. iv) Steps taken by the applicant to reduce and eliminate the non-complying discharge and v) Steps to be taken by the applicant too prevent the condition of non-compliance.	
(b)	The applicant shall take all reasonable steps to minimize any adverse impact to natural waters resulting from non-compliance with any effluent limitation specified in this consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.	Shall be Complied
(c)	Nothing in this consent shall be construed to relieve the applicant from civil or criminal penalties for non- compliance whether or not such non-compliance is due to factors beyond his control, such as break-down, electric failure, accident or natural disaster.	Noted
4.	Proper housekeeping shall be maintained inside the factory premises including process areas by a dedicated team.	Unit has been provided the water tanker for road sprinkling purposed and also dedicated housekeeping team provided in separate department.
5.	The occupier must constitute a team of responsible and technically qualified personnel who will ensure continuous operation of all pollution control devices round the clock (including night hours) and should be in a position to explain the status of operation of the pollution control measures to the inspecting officers of the Board at any point of time. The name of these persons with their contact telephone numbers shall be intimated to the concerned Regional Officer and Head Office of the Board and in case of any change in the team it shall be intimated to the Board immediately.	is being complied
6.	The Occupier shall engage dedicated	Ferro Alloys division has been established

ANNEXURE : XXII Contd..

	qualified manpower to ensure continuous and effective operation of online stack / Ambient Air Quality / Effluent monitoring stations for maintenance of database, real time data transfer to SPCB server, data analysis and co-ordination with concerned personnel of process units for taking corrective measures in case of non-compliances and to respond to the instructions of SPCB in this matter.	the Environment Cell with qualified person at the project and company head quarter level for taking corrective measures in case of non-compliances and to respond to the instructions of SPCB in this matter.
E.	**SPECIAL CONDITIONS**	
1.	The Process water, if any shall be completely recycled after adequate treatment and no case there shall be discharge to outside.	Process water is being completely recycled
2.	The surface water Run-off generated from the factory premises shall be treated adequately to meet the prescribed standards (PH: 5.5-9.0, TSS: 100 mg/l, BOD: 30 mg/l, COD: 250 mg/l, Oil & Grease: 10 mg/l, The treated run-off shall be utilized to the maximum extent and the surplus quantity shall be discharged to outside.	The surface water Run-off generated from the factory premises is being stored in Rain water harvesting reservoir
3.	Solid waste generated from the plant shall be dispose of inside the factory premises in such a manner that there shall not be any ground water contaminated and cause any dust nuisance.	Solid waste generated from Ferro alloys is being used in manages sinter plant
4.	Solid waste such as slag and dust from APC devices shall be stored in a designated area inside the factory premises, slag shall be used for road construction or filling of low laying area outside the factory premises.	Is being complied
5.	The garland drain around slag dumping area followed by series of settling tanks provided to retain the solids carried away by runoff and washing shall be cleaned periodically and excavated materials shall be dumped in the dump yard.	Shall be complied
6.	The GCP for treated of flue gas of sinter plant shall be installed before commissioning of sinter plant, The commissioning of sinter plant with GCP shall be done in presence of regional Office, Angul.	Agreed
7.	The unit shall maintain and operate all the pollution control equipment properly so that the particulate Matter Emission from the stacks attached to GCP of sinter plant shall not exceed the prescribed standard i.e. 100 mg/Nm3.	is being complied
8.	Manganese Ore fine shall be stored in	Manganese ore is being stored in covered shed

ANNEXURE : XXII Contd..

	covered shed.	
9.	The unit should maintain proper housekeeping inside the plant premises especially in the raw material handling area.	Proper Housekeeping is maintained
10.	System shall be in place to minimize fugitive dust emission from the raw material handling area.	Fugitive emission is being carried out and results are well within limits
11.	All the internal roads shall be made black topped / concreted and shall be cleaned regularly to minimize fugitive emission.	Internal road 375 m has been concreted
12.	A time bound action plan shall be furnished to carry out the following jobs. a) Concrete drains shall be constructed around raw material handling area and connected to a settling pond. b) Dry fog system shall be provided at raw material ground hopper, screens and vibratory screens.	Concrete drain will in constructed
13.	The industry shall meet the ambient air quality inside the factory premises as annexed.	Ambient air quality monitoring is being carried out by MOEF&CC/ NABL Accredited lab. All parameters are well within limits
14.	The height of the stack attached to the DG sets shall confirm to the following: H=h+0.2 KVA where, h= height of the building where it is installed, KVA = Capacity of the DG set, H= Height of the stack in meter above ground level.	Height provided as per CPCB norms
15.	The industry shall develop a green belt along its boundary and vacant areas available inside the premises.	Total existing plant area is 52.525 acres out of which 17.33 acres green belt developed, which is 33% of the plant area.
16.	The industry shall construct a rainwater harvesting structure for utilization of the rain water collected from the roof top of all building and catchment area of the industry for recharging of ground water within the premises as per the concept and practices prescribed by CPCB.	Rainwater harvesting structure for utilization of the rain water collected from the roof top of all building will be completed
17.	The unit shall abide by the provisions of Environment (Protection) Act, 1986 and rules framed there under.	Not applicable
18.	The unit shall obtain authorization from the Board under the Hazardous & Other waste (Management and Tranboundary Movement) Rules, 2016.	Authorization obtained from OSPCB
19.	In case the consent fee is revised upwards during this period of consent the unit shall	Agreed

ANNEXURE : XXII Contd..

	pay the differential amount to the Board (for the remaining years) to keep the consent order in force. If the industry fails to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.	
20.	The Board reserves the right to revoke / refuse consent at any time during this period in case any violation is observed and modify/ stipulate additional conditions as deemed appropriate.	Agreed



G.P. Sharma
General Manager (Env)

ANNEXURE : XXIII



भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास
और गंगा संरक्षण विभाग
केन्द्रीय भूमि जल प्राधिकरण
Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Central Ground Water Authority

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)
NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION

Project Name:	M/s Rungta Mines Limited		
Project Address:	Village: Tulsidiha, Block Odapada		
Village:	Tulasidihi	Block:	Odapada
District:	Dhenkanal	State:	Odisha
Pin Code:			
Communication Address:	Rungta Mines Limited (ferro Alloys Division), At/po:tulsidiha,via:meramundali, Odapada, Dhenkanal, Odisha - 759121		
Address of CGWB Regional Office :	Central Ground Water Board South Eastern Region, Bhujal Bhawan, Khandagiri Square, Nh-5, Bhubaneshwar, Khordha, Odisha - 750001		

1.	**NOC No.:**	CGWA/NOC/IND/REN/1/2021/5971			
2.	Application No.:	21-4/2199/OR/IND/2019	3.	Category: (GWRE 2017)	Safe
4.	Project Status:	Existing Ground Water	5.	NOC Type:	Renewal
6.	**Valid from:**	08/05/2021	7.	**Valid up to:**	07/05/2024

8. Ground Water Abstraction Permitted:

Fresh Water		Saline Water		Dewatering		Total	
m³/day	m³/year	m³/day	m³/year	m³/day	m³/year	m³/day	m³/year
30.00	10950.00						

9. Details of ground water abstraction /Dewatering structures

	Total Existing No.:2						**Total Proposed No.:0**					
	DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu
Abstraction Structure*	0	0	2	0	0	0	0	0	0	0	0	0

*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps

10.	Ground Water Abstraction/Restoration Charges paid (Rs.):	32850.00

11.	Number of Piezometers(Observation wells) to be constructed/ monitored & Monitoring mechanism.	No. of Piezometers	Monitoring Mechanism		
			Manual	DWLR**	DWLR With Telemetry
	**DWLR - Digital Water Level Recorder	1	1	0	0

(Compliance Conditions given overleaf)

This is an auto generated document & need not to be signed.

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011
Phone: (011) 23383561 Fax: 23382051, 23386743
Website: cgwa-noc.gov.in

पानी बचाये – जीवन बचाये
SAVE WATER - SAVE LIFE

ANNEXURE : XXIII Contd..

Validity of this NOC shall be subject to compliance of the following conditions:

Mandatory conditions:

1) Installation of tamper proof digital water flow meter with telemetry on all the abstraction structure(s) shall be mandatory for all users seeking No Objection Certificate and intimation regarding their installation shall be communicated to the CGWA within 30 days of grant of No Objection Certificate.

2) Proponents shall mandatorily get water flow meter calibrated from an authorized agency once in a year.

3) Construction of purpose-built observation wells (piezometers) for ground water level monitoring shall be mandatory as per Section 14 of Guidelines. Water level data shall be made available to CGWA through web portal. Detailed guidelines for construction of piezometers are given in Annexure-II of the guidelines.

4) Proponents shall monitor quality of ground water from the abstraction structure(s) once in a year. Water samples from bore wells/ tube wells / dug wells shall be collected during April/May every year and analysed in NABL accredited laboratories for basic parameters (cations and anions), heavy metals, pesticides/ organic compounds etc. Water quality data shall be made available to CGWA through the web portal.

5) In case of mining projects, additional key wells shall be established in consultation with the Regional Director, CGWB for ground water level monitoring four (4) times a year (January, May, August and November) in core as well as buffer zones of the mine.

6) In case of mining project the firm shall submit water quality report of mine discharge/ seepage from Govt. approved/ NABL accredited lab.

7) The firm shall report compliance of the NOC conditions online in the website (www.cgwa-noc.gov.in) within one year from the date of issue of this NOC.

8) Industries abstracting ground water in excess of 100 m 3 /d shall undertake annual water audit through certified auditors and submit audit reports within three months of completion of the same to CGWA. All such industries shall be required to reduce their ground water use by at least 20% over the next three years through appropriate means.

9) Application for renewal can be submitted online from 90 days before the expiry of NOC. Ground water withdrawal, if any, after expiry of NOC shall be illegal & liable for legal action as per provisions of Environment (Protection) Act, 1986.

10) This NOC is subject to prevailing Central/State Government rules/laws/norms or Court orders related to construction of tube well/ground water abstraction structure / recharge or conservation structure/discharge of effluents or any such matter as applicable.

General conditions:

11) No additional ground water abstraction and/or de-watering structures shall be constructed for this purpose without prior approval of the Central Ground Water Authority (CGWA).

12) The proponent shall seek prior permission from CGWA for any increase in quantum of groundwater abstraction (more than that permitted in NOC for specific period).

13) Proponents shall install roof top rain water harvesting in the premise as per the existing building bye laws in the premise.

14) The project proponent shall take all necessary measures to prevent contamination of ground water in the premises failing which the firm shall be responsible for any consequences arising thereupon.

15) In case of industries that are likely to contaminate the ground water, no recharge measures shall be taken up by the firm inside the plant premises. The runoff generated from the rooftop shall be stored and put to beneficial use by the firm.

16) Wherever feasible, requirement of water for greenbelt (horticulture) shall be met from recycled / treated waste water.

17) Wherever the NOC is for abstraction of saline water and the existing wells (s) is /are yielding fresh water, the same shall be sealed and new tubewell(s) tapping saline water zone shall be constructed within 3 months of the issuance of NOC. The firm shall also ensure safe disposal of saline residue, if any.

18) Unexpected variations in inflow of ground water into the mine pit, if any, shall be reported to the concerned Regional Director, Central Ground Water Board.

19) In case of violation of any NOC conditions, the applicant shall be liable to pay the penalties as per Section 16 of Guidelines.

20) This NOC does not absolve the proponents of their obligation / requirement to obtain other statutory and administrative clearances from appropriate authorities.

21) The issue of this NOC does not imply that other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would consider the project on merits and take decisions independently of the NOC.

22) In case of change of ownership, new owner of the industry will have to apply for incorporation of necessary changes in the No Objection Certificate with documentary proof within 60 days of taking over possession of the premises.

23) This NOC is being issued without any prejudice to the directions of the Hon'ble NGT/court orders in cases related to ground water or any other related matters.

24) Proponents, who have installed/constructed artificial recharge structures in compliance of the NOC granted to them previously and have availed rebate of upto 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges, shall continue to regularly maintain artificial recharge structures.

25) Industries which are likely to cause ground water pollution e.g. Tanning, Slaughter Houses, Dye, Chemical/ Petrochemical, Coal washeries, pharmaceutical, other hazardous units etc. (as per CPCB list) need to undertake necessary well head protection measures to ensure prevention of ground water pollution as per Annexure III of the guidelines.

26) In case of new infrastructure projects having ground water abstraction of more than 20 m3/day, the firm/entity shall ensure implementation of dual water supply system in the projects.

27) In case of infrastructure projects, paved/parking area must be covered with interlocking/perforated tiles or other suitable measures to ensure groundwater infiltration/harvesting.

28) In case of coal and other base metal mining projects, the project proponent shall use the advance dewatering technology (by construction of series of dewatering abstraction structures) to avoid contamination of surface water.

29) The NOC issued is conditional subject to the conditions mentioned in the Public notice dated 27.01.2021 failing which penalty/EC/cancellation of NOC shall be imposed as the case may be.

(Non-compliance of the conditions mentioned above is likely to result in the cancellation of NOC and legal action against the proponent.)

CENTRAL GROUND WATER AUTHORITY

ANNEXURE : XXIV

Office of the Superintending Engineer
Rengali Right Canal Division No.II, Dhenkanal

Lr.No. 356/NE Dt 14.02.2023

To

The General Manager (Plant),
M/S Rungta Mines Ltd (Ferro Alloys Division)
At/- Tulasidiha, PO Meramundali
Dist-Dhenkanal

Sub: - Certified copy agreement for drawal of surface water for the plant at Tulasidiha, Dist-Dhenkanal.

Sir,

With reference to the letter cited on the above subject, it is to intimate that agreement has been executed with you for drawal of surface water for the plant at Tulasidiha, Dist:-Dhenkanal on 6.2.2020.

The certified copy of agreement No. 8(I,W) of 2022-23 Dt. 6.2.2023 is enclosed herewith for your needful action.

Yours Faithfully,

End: As above

Superintending Engineer
RengaliRightCanal Division No II

Memo No. 357/NE /Dt. 14.02.2023

Copy along with the certified copy of agreement submitted to the Addl. Secretary to Govt. Deptt. of Water Resources, Odisha, Bhubaneswar for favour of kind information and necessary action.

End: As above

Superintending Engineer
Rengali Right Canal Division No II

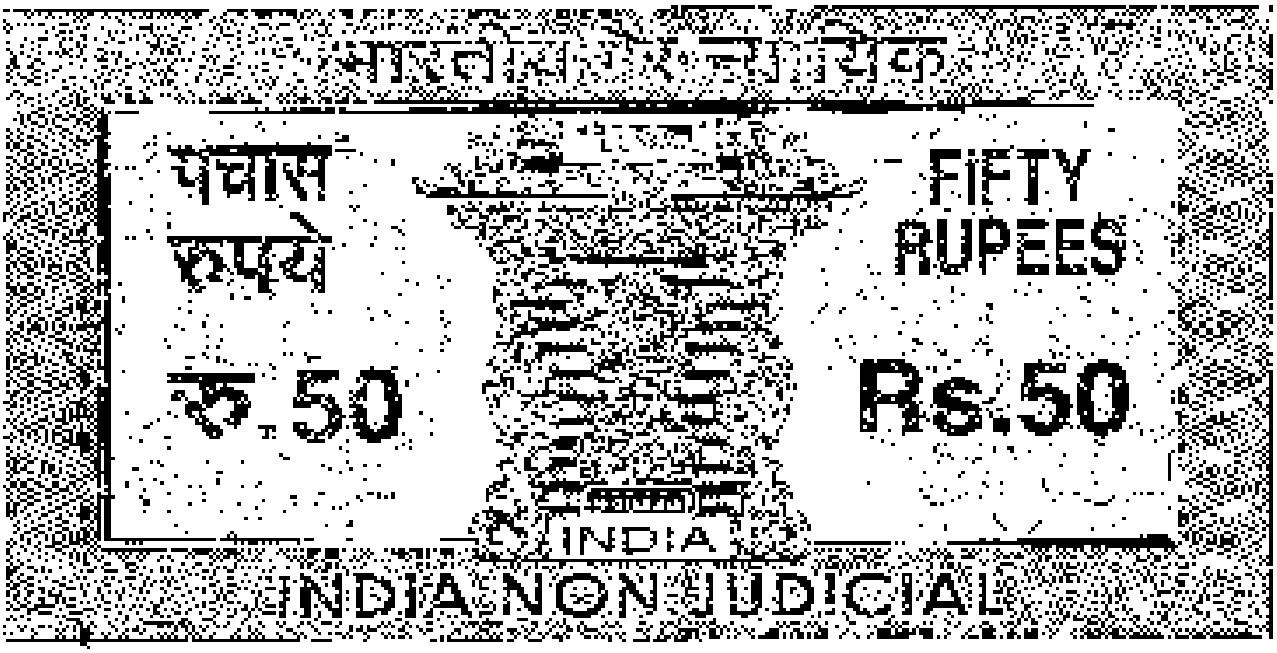
Memo No: (2) 358/NE /Dt. 14.02.2023

Copy along with the copy of certified copy of agreement submitted to the Chief Engineer, Water Services office of the Engineer-in-Chief, Water Resources, Secretariat, Bhubaneswar / Chief Engineer, Rengali Right Irrigation Project Dhenkanal for favour of kind information and necessary action.

End: As above

Superintending Engineer
Rengali Right Canal Division No II

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"FORM 'K'

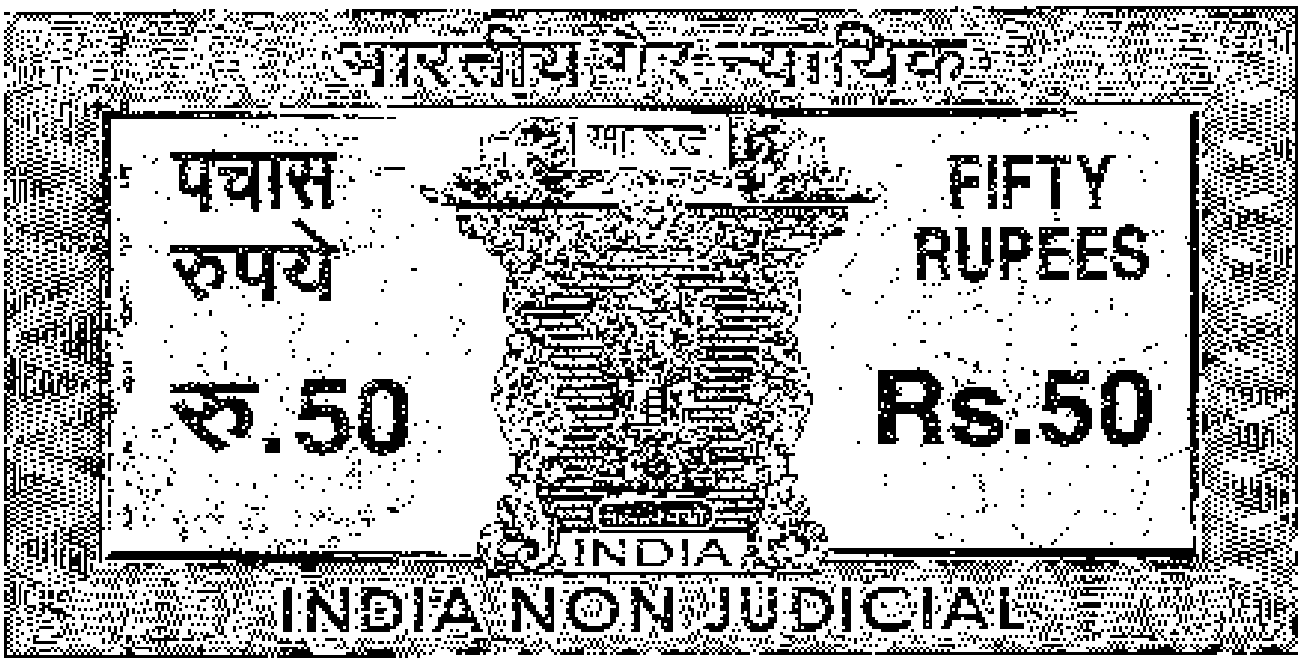
[See rule 73-A (2) (e) & rule 26]

AGREEMENT FOR SUPPLY OF WATER FOR THE PURPOSE

OF INDUSTRIAL/COMMERCIAL USE

THIS AGREEMENT is made on the 6th day of February Two thousand twenty three BETWEEN Shri Jayanta Kumar Panda, son of Late Purushottama Panda, resident of Village-Uditeswar, P.O-Bajpur, P.S- Jajpur, District Jajpur in the State of Odisha by profession General Manager(Plant) M/S Rungta Mines Limited (Ferro Alloys Division) having its Plant at Tulasidiha, P.O Meramundali, Dist- Dhenkanal, Odisha (hereinafter called the "Applicant") of the first part AND (1) Shri Himanshu Kumar Behera, son of Late Nabakishore Behera, resident of Village-Banamalipraasad, P.O-Mangalpur, P.S-Town, District-Dhenkanal in the State of Odisha by profession Deputy General Manager(HR), M/S Rungta Mines Limited (Ferro Alloys Division) having its Plant at Tulasidiha, P.O-Meramundali Dist- Dhenkanal, Odisha (2) Sri Balabhadra Mohapatra, Son of Late Nityananda Mohapatra resident of village-Kenani, P.O-Birasal, P.S-Kamakhyanagar, District-Dhenkanal, Odisha by profession S. Manager (Commercial), M/S Rungta Mines Limited (Ferro Alloys Division) having its Plant at Tulasidiha P.O-Meramundali, Dist-Dhenkanal, Odisha (hereinafter referred to as the "Sanctee") of the Second part AND Sri Nihar Ranjan Patra, Son of Pankaj Lochan Patra resident of village/PO- Balarampur, P.S- Sadar, District- Dhenkanal by profession Superintending Engineer, Rengali Right

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Canal Division No-II, Dhenkanal representing the Governor of Odisha which expression unless repugnant to the context shall include his successors and assigns (hereinafter called "The Government") of the third part. WHEREAS, the applicant has made an application for supply of water from Government water source /Irrigation works for the period as mentioned in the Schedule; here to annexed;

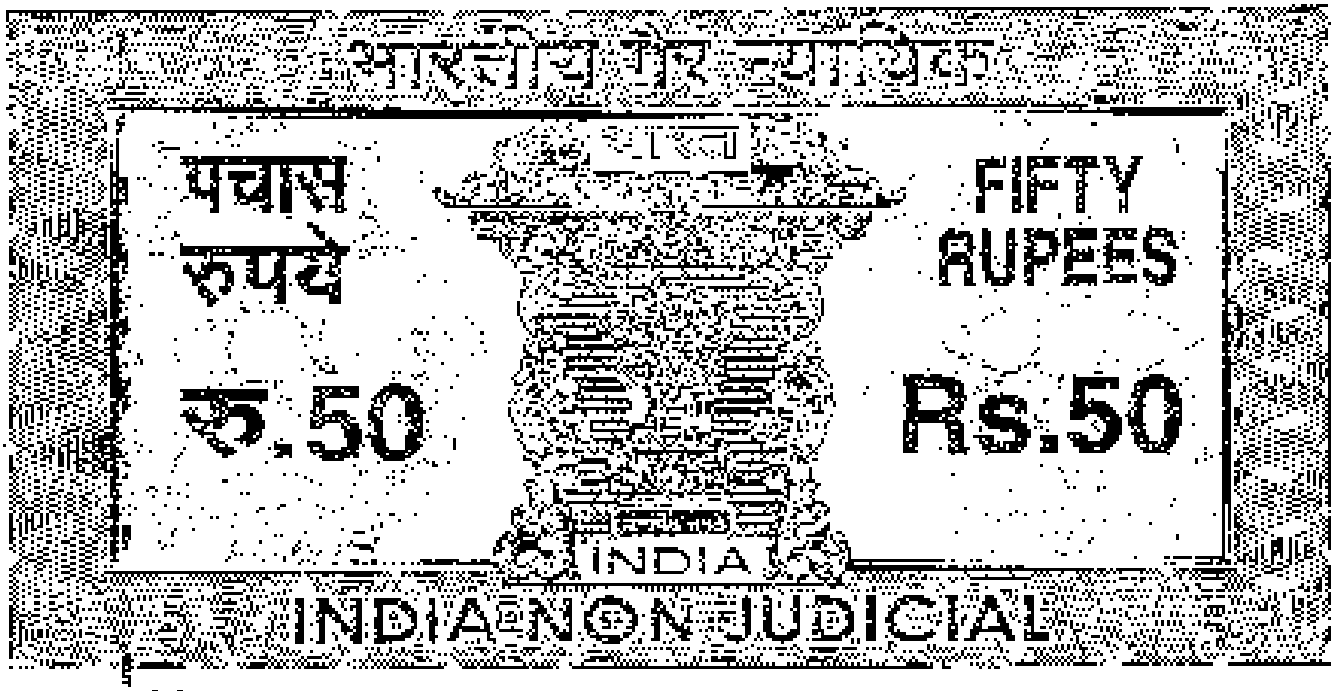
AND, WHEREAS, the sureties have agreed to stand surety for payment of rates charged for such supply in the manner hereinafter appearing and the Government has agreed to supply water for the purpose specified in the schedule annexed hereto —

SCHEDULE

Purpose for which water will be supplied	Volume of water, if any	Period of supply	The place at which it will be supplied
(1)	(2)	(3)	(4)
We envisage our requirement of water for the purpose of industrial purpose.	0.30cusec or 733.972 cum per day	Continuous as per availability from the sources from 06.02.2023 to 05.02.2026	To the plant site reservoir

NOW THIS AGREEMENT witnesseth as follows: —

1. In pursuance of the said agreement and in consideration of supply of water to be made to the applicant, the applicant and the sureties hereby jointly and severally covenant with the Government as follows : —



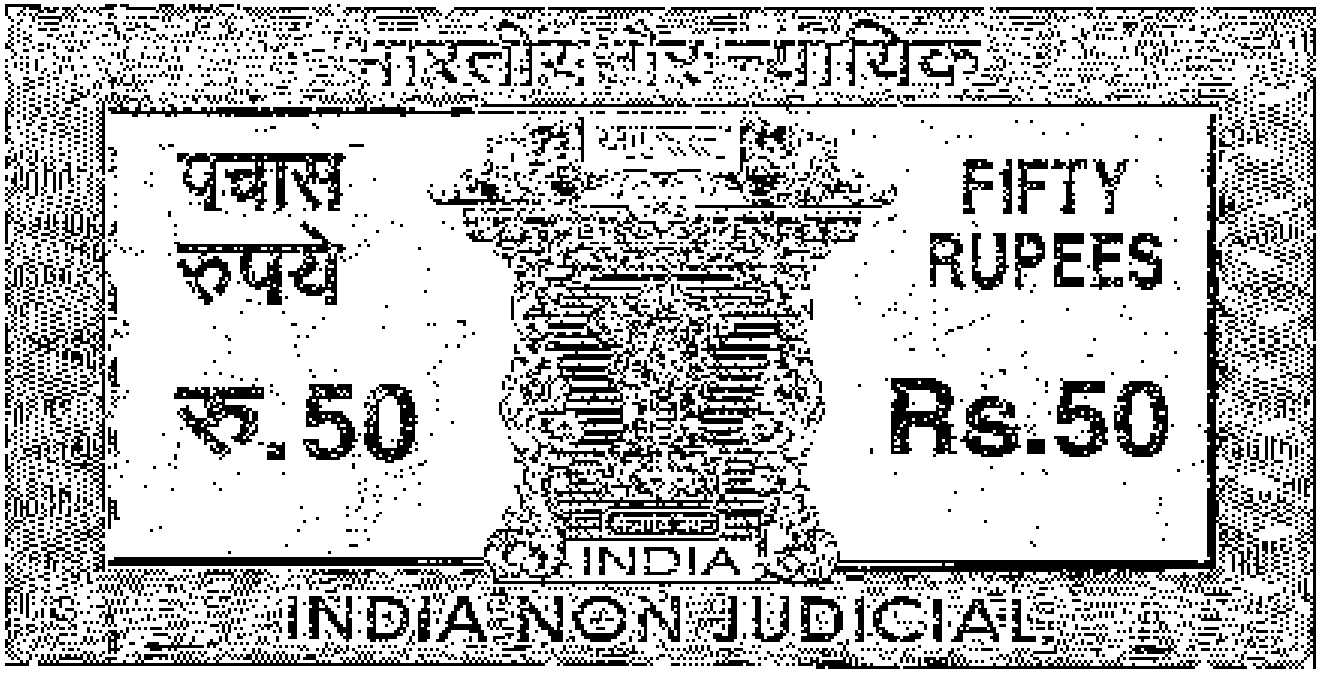
(a) M/S Rungta Mines Limited (Ferro Alloys Division) shall pay monthly water tax at the prevailing rate as applicable and at revised ratios of water to be fixed by the Govt. of Odisha from time to time and 10% enhancement per annual in respect of water rate with effect from the first day of April as notified by the applicant on or before the last date of the succeeding month as per the quantum of water allocated to them.

(b) The applicant shall make suitable arrangement to take the water from the Government water source at which it will be supplied.

(c)The applicant shall not use the water supplied to him for any purpose other than that which is specified in the said Schedule.

2. If the sum aforesaid or any part thereof, is not paid on or before the date specified in this agreement it shall become payable at once (unless the Government sanctions for special reason an extension of time) and the applicant and the sureties shall be liable jointly and severally to pay the same with compound interest at the rate of two per cent per mensem from the date of default. All amount due to the Government under the terms of these presents shall if not paid in time, be recoverable as a public demand under the Orissa Public Demands Recovery Act, 1962.

3. (i)M/S Rungta Mines Limited (Ferro Alloys Division) shall be liable for criminal and civil action if by drawal of water,the rights of any third party are affected and shall



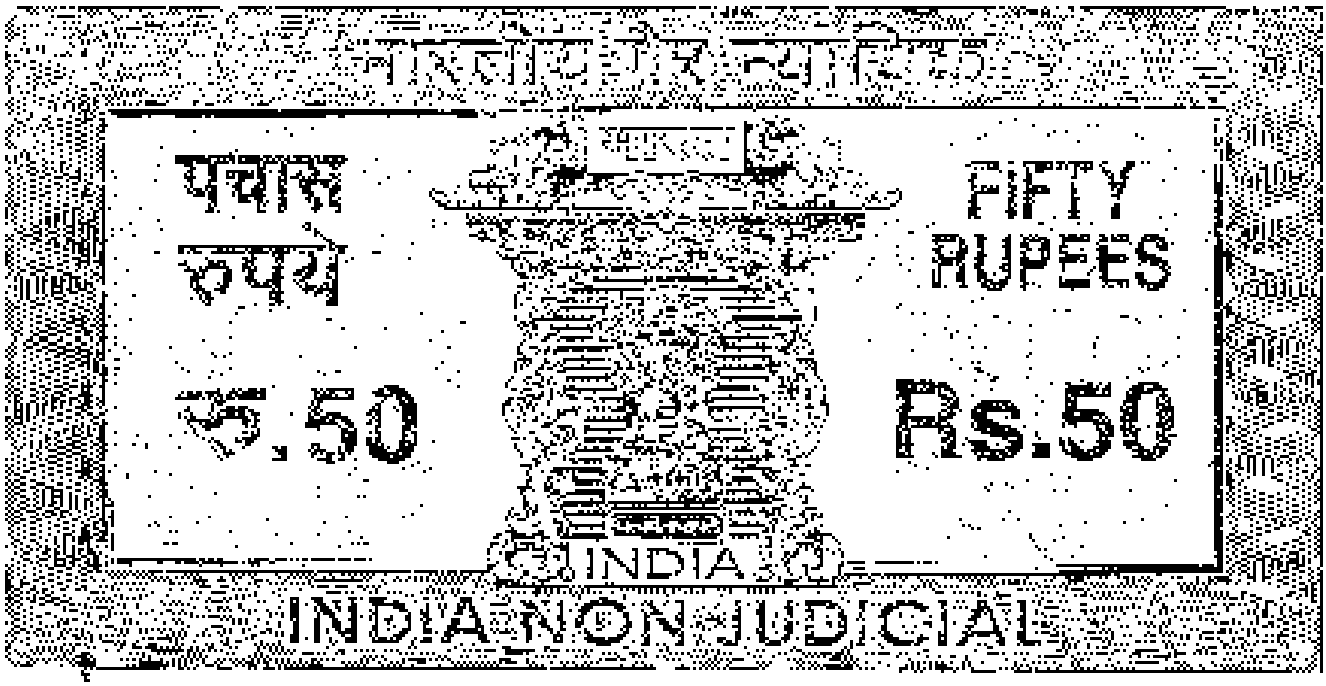
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indemnify the Government against all claims for damage preferred by person or persons affected by the permission granted.

(ii)M/S Rungta Mines Limited (Ferro Alloys Division)shall not without prior permission in writing from the Government lay pipe line on Government or communal lands. If the pipe lines have to pass through Government lands permission of the Government for this shall be taken separately which may be granted subject to the protection of rights of Government or community, as the case may be.

(iii)M/S Rungta Mines Limited (Ferro Alloys Division) shall not draw or lift water more than the quantity mentioned in the requisition or order and not exceeding the volume mentioned in the Schedule except with the prior approval of the Government. The Superintending Engineer shall assess the fee to be charged as per Unit /quantity of water drawn or allocated whichever is higher. If drawal is more than the allocation, a penal rate at six times the rate specified in Schedule II and III shall be charged on the quantity of excess drawal, in addition to the normal bill on allocated quantity. The excess drawal is permissible for a maximum period of six months, within which, the licensee shall have to apply for a higher allocation of water with reasons and where the licensee fails to so apply for such higher allocation or where the licensee is refused for such higher allocation, the agreement shall be liable to cancellation and the water supplied shall be stopped thereafter.

(iv)The permission granted shall not be deemed to exempt the applicant from

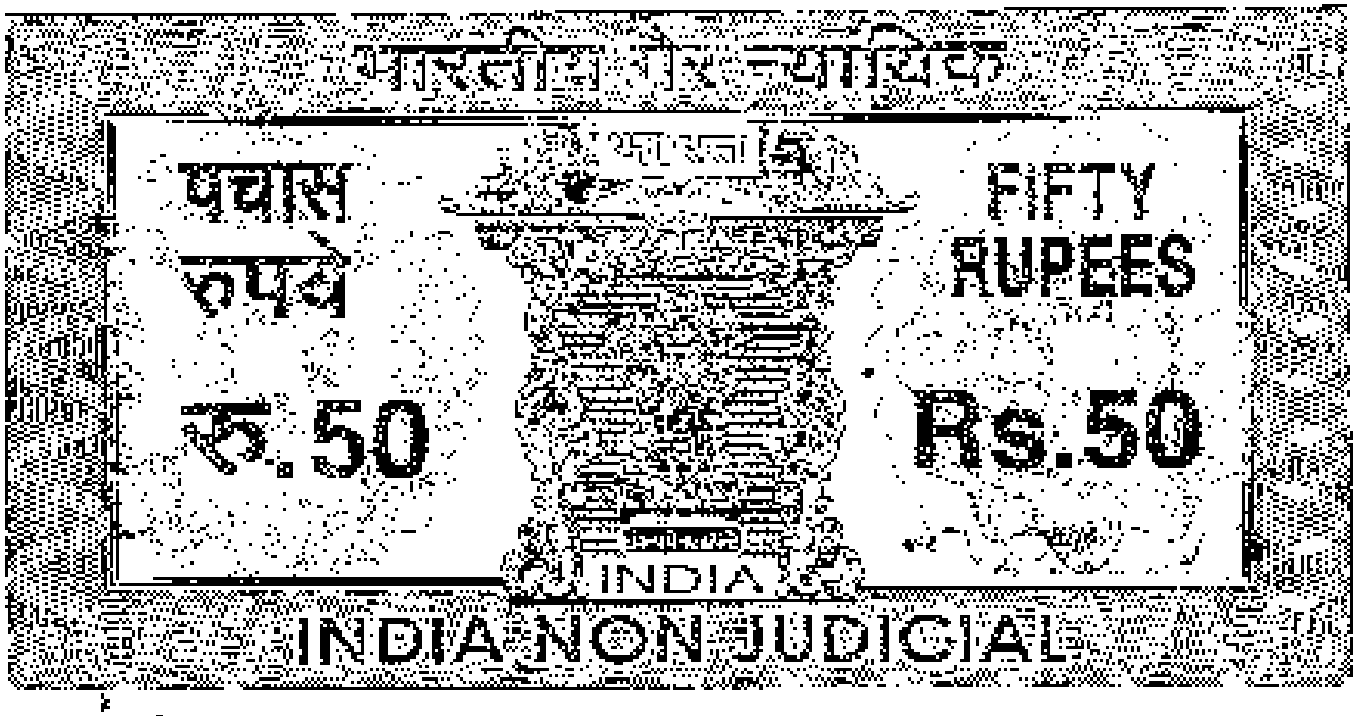


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liability to payment of water charges lawfully assessable at the rate as may be prescribed by Government from time to time

(v)Government reserves the right to suspend or cancel the permission in case of violation of any of the covenants.

4. M/S Rungta Mines Limited (Ferro Alloys Division) at his own cost shall install a Flow Meter or a suitable measuring device for measurement of water drawn or lifted by him from the Government water source as per the procedure laid down in rule 23-A(b). The Superintending Engineer shall visit the location of drawal or lifting of water, verify the quantities of water drawn or lifted by the applicant and ensure such control as may be necessary for administering the drawal or lifting of water. Assessment of water rate shall be made as per the quantity of water drawn or allocated whichever is higher. In case of any defect or non-functioning of the Flow Meter, the licencee shall bring the fact to the notice of the concerned Superintending Engineer forthwith and take appropriate steps to remove the defects in the Meter or for replacement thereof within a period of two months and in such cases the fees shall be charged on the quantity of water allocated for the said period of three months or till the defect in the Meter is removed or the Meter is replaced, as the case may be, whichever is earlier, and where the licencee fails to bring the defect or non-functioning of the Meter to the notice of the Superintending Engineer or fails to remove the defects in the Meter or to replace the same, as the case may be, within the stipulated period the agreement shall be liable to cancellation and thereafter the water supply shall



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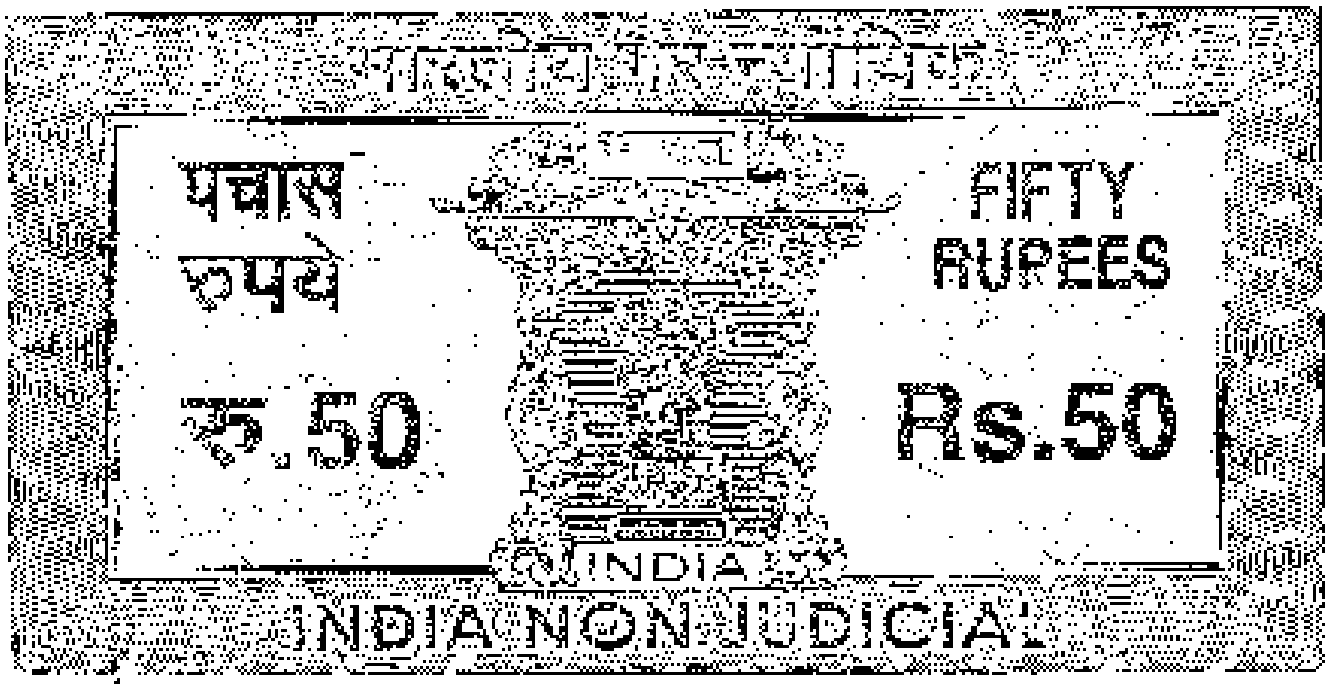
be stopped.

5. M/S Rungta Mines Limited (Ferro Alloys Division)shall construct full proof effluent discharge plant before commissioning of the project. For proper test of such effluent there shall be computerized testing system and the applicant shall give details of effluent discharged in the natural source (in river and nalla)

6. For construction of head works and control mechanism i.e. intake well, pump house and other related facilities, M/S Rungta Mines Limited (Ferro Alloys Division)will get the land leased in their favour through IDCO as is done in respect of any other government land required by the Industry. IDCO will make available land on long term lease to M/S Rungta Mines Limited (Ferro Alloys Division) Chenkanal. The continuance of the lease agreement will be subject to the condition that the industry shall pay water charges as per prevailing water rate and all other dues of Government and IDCO from time to time.

7. M/S Rungta Mines Limited (Ferro Alloys Division) would be required to pay advance water charges for a year Rs 14,57,275.00 (Rupees Fourteen Lakhs Fifty Seven Thousand Two Hundred Seventy Five) only for the period of 5years @ 5.44 per1000 Ltr or One cum Inshape of Bank Draft in favor of Superintending Engineer concerned or in shape of FDR duly discharged by the company as non– interest bearing security deposit to be adjusted against defaults.

8. In case of water supply for the M/S Rungta Mines Limited (Ferro Alloys Division) is



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bu bu mat from a common source through a sharing mechanism, such common infrastructure for drawal of water will be constructed, maintained and operated either by IDCO or Special Purpose Vehicle (SPV) after taking due clearance from IDCO. Water will be supplied to M/S Rungta Mines Limited (Ferro Alloys Division) by IDCO/SPV and they would also be liable for payment of water rate to the Government and will in turn have arrangements as similar therein as clauses (6) and (7) of this agreement.

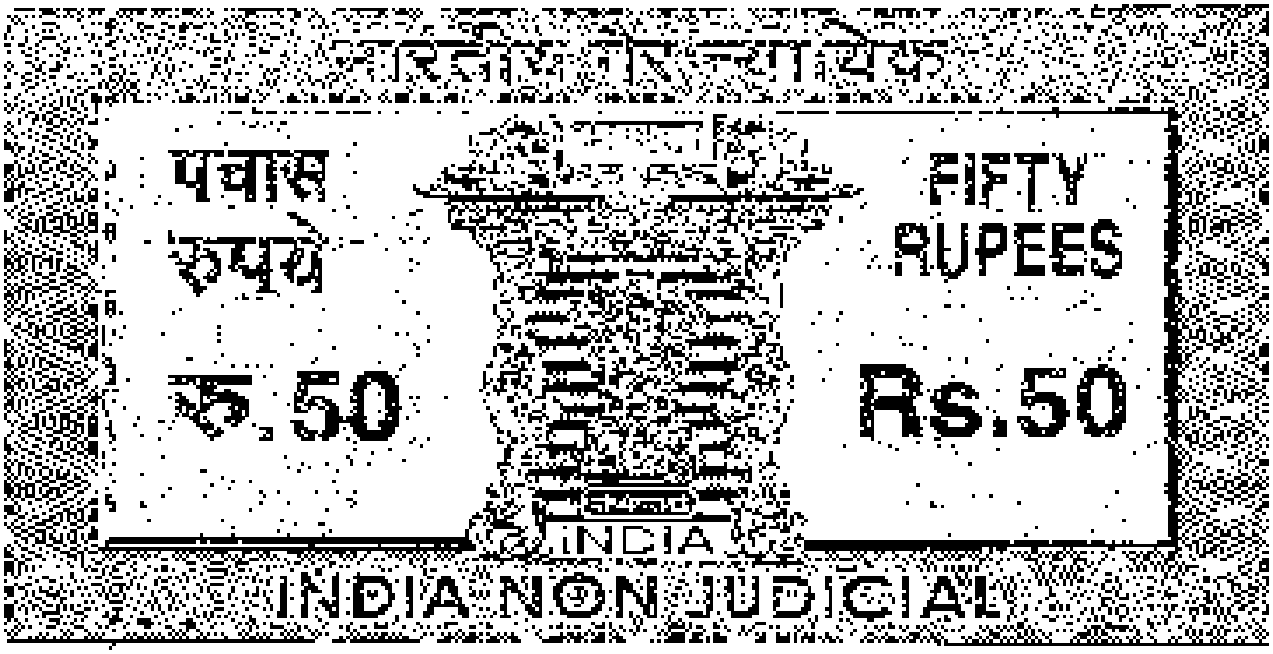
9. They will not disturb/affect the normal flow of water so that riparian rights in the downstream will be affected and the company shall have no claim on the account.

10. The drawal mechanism for raw water and disposal system of effluent to be established by the industry without disturbing existing eco system and environmental set up.

11. The Rehabilitation and Resettlement Action Plan/ Welfare Action Plan, if so required will be prepared in conformity with the current Orissa Rehabilitation and Resettlement Policy and executed by the company at its own cost under the supervision of the Water Resources Department and the Collector of the District, Dhenkanal.

12. M/S Rungta Mines Limited (Ferro Alloys Division) shall not claim as a matter of right to get the desired quantity of water during non-monsoon and lean period to meet their full industrial use and the company has to make adequate storage facility in their own land for supply of water to their plant during such period.

13. The safety design of all the structures lies fully on the company.



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14. In case of any dispute arising out of this agreement, the same shall be referred to Government and the decision of the Government in Water Resources Department shall be final.

15. This agreement shall be valid for a period of 3 years subject to renewal of the same by the Superintending Engineer. For renewal of the agreement the concerned drawee has to be apply minimum three months before the expiry of the agreement.

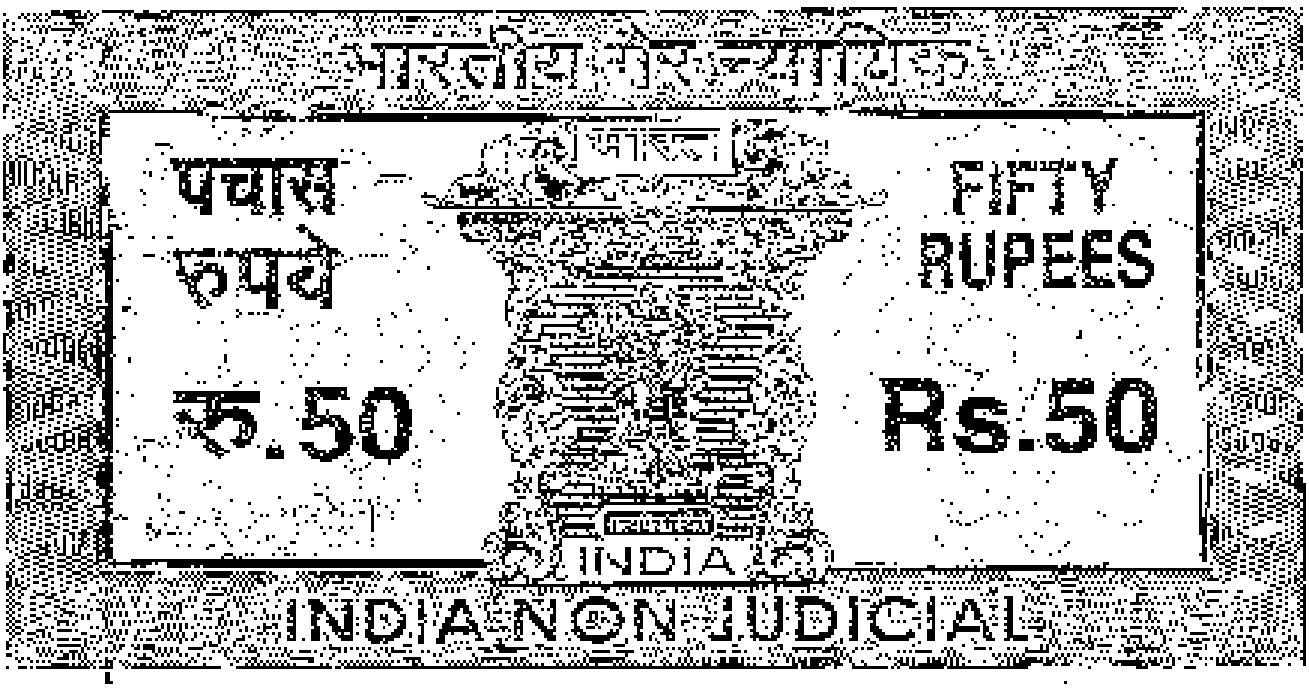
16. If the industry is found to be drawing water unauthorisedly before signing the agreement / installation of flow-meter, the concerned Superintending Engineer will charge a penal rate at six times the normal rate as provided in Schedule II and III.

17. Government shall be at liberty to review the water allocation unilaterally in case of exigencies.

18. The Superintending Engineer or his authorized representative reserves the right to inspect all installations of drawal and disposal mechanism during and after construction including intake structure, flow meter and treatment plant.

19. M/S Rungta Mines Limited (Ferro Alloys Division) will have to show clearly in water management plan as to what storage facility the company will create for the lean season and to what extent and how the water is going to be recycled which shall be a part of the project report of the unit.

20. M/S Rungta Mines Limited (Ferro Alloys Division) may engage at their own cost consultant(s) experienced in the field to take up field investigations, prepare design and



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drawing to set up the water supply scheme for drawing water from Government water source/irrigation works for their proposed plant. The actual work will start after approval of the scheme by the competent authority of Water Resources Department who can inspect the work during the construction

21. The exact place for lifting will be decided in consultation with the authority of Water Resources Department.

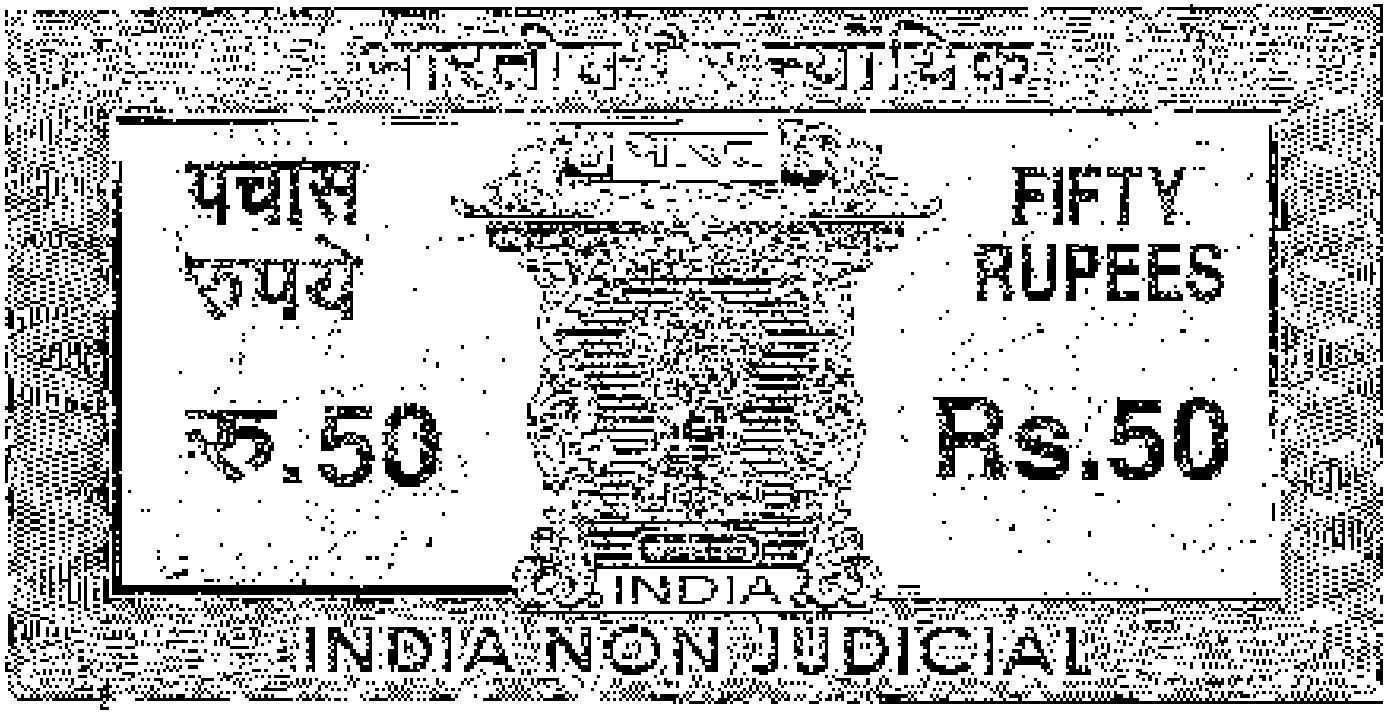
22. Department of Water Resources shall not be held responsible for non-availability of water due to dry season, disruption, repair and maintenance of canal/reservoir.

23. Agreement to be executed by the industry/commercial establishment with local authority/ Superintending Engineer must be approved by the Department of Water Resources before drawal of water.

J.K. PANDA
G.M. (PLANT)

Superintending Engineer
Hirakud Right Canal Division No-V
Sambalpur, Dhankauda

ANNEXURE : XXIV Contd..



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In Witness whereof the Parties hereto have put their hands and seals the day and year first above-written

In the presence of witnesses :

1.

2.

In the presence of witnesses

1.

2.

In the presence of witnesses

1.

2.

Signature of applicants

1

A.K. PANDA
GM. (PLANT)

Signature of sureties

1.

H. K. Behera
DGM(HR)

2.

B. MOHAPATRA
Sr. Manager (Comml.)

SIGNATURE OF THE SUPERINTENDING ENGINEER

acting in the premises for and on behalf of the Governor of Odisha

ANNEXURE : XXV

Rungta Mines Limited

(FERRO ALLOYS DIVISION)

Works : Vill :- Tulasidihe, P.O. :- Meramandali, Dist. :- Dhenkanal - 759121, ODISHA, INDIA
Phone : (06732) 258171, Fax : (06732) 258171 Email : fad@rungtamines.co.in

Ref: RML/FAD/WLCP/22-23/181 Dated 16.01.2023

To,
The Divisional Forest Officer,
Dhenkanal Forest Division,
Dhenkanal
Odisha

Sub.: Preparation and Approval of Site Specific Wildlife Conservation Plan for proposed Expansion of Ferro Alloys Division of M/s Rungta Mines Limited From 0.055 MTPA TO 0.283 MTPA Ferro Alloys Plant Along With 150 Mw CPP at Village Tulsidiha District Dhenkanal Odisha.

Ref.: TOR vide letter no. IA-J-11011/515/2022-IA.II(I) dated 01.12.2022.

Dear Sir

With reference to the above cited subject, we wish to submit that as per the EIA notification September 2006, we have applied to MOEF&CC New Delhi for Environmental Clearance for above project. Terms of Reference (TOR) is accorded by MOEF&CC vide letter no. IA-J-11011/515/2022-IA II(I) dated 01.12.2022.

In the 2(b) Standard terms of reference for conducting Environment Impact Assessment study for mineral Beneficiation Projects and Information to be included in EIA/EMP report in Condition No 27 it is mentioned "A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey clearly indicating the Schedule of the fauna present. *In case of any scheduled- I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost*".

As per memo no 3332/CWLW-FDWC-MISC 0026-2021 dated 16.04.2022 of PCCF(Wildlife) & Chief Wildlife Warden, Government of Odisha, the Site Specific Wildlife Conservation Plan will be prepared by your good office for final approval by competent authority for implementation of the same to comply the conditions of TOR.

ANNEXURE : XXV Contd..

Rungta Mines Limited

(FERRO ALLOYS DIVISION

Works : Vill :- Tulasidiha, P.O. :- Meramandali, Dist. :- Dhenkanal - 759121, ODISHA. INDIA

Phone : (06732) 258171, Fax : (06732) 258171 Email : fad@rungtamines.co.in

We, therefore, request your good self to kindly take necessary action for preparation & approval of Site Specific Wildlife Conservation Plan for proposed Expansion of Ferro Alloys plant from 0.055 MTPA to 0.253 MTPA along with 150 MW Captive Power Plant of M/s Rungta Mines Limited (Ferro Alloys Division) located at villages Tulasidiha in Dhenkanal District Odisha

Thanking You.

Yours faithfully
M/s Rungta Mines Ltd.
(Ferro Alloys Division)

(P.K.Chaudhary)
Director

Enclosed. As above

Registered Office : 8A, Express Tower, 42A, Shakespeare Sarani, Kolkata - 700 017, (WEST BENGAL), INDIA

ANNEXURE : XXVI

Form No. 31 – A

HEALTH RECORD

(Pre – employment/ Periodical) **Date :**

[Prescribed under Rule 62 – 1] **SL No.**

1.	**Name of the Factory**	**: RUNGTA MINES LIMITED (Ferro Alloys Division)**
2.	**Name of the Employee**	**:**
3.	**Employee Distinguishing Number**	**:**
4.	**Age of Employee**	**:**
	Identification mark	**:**
	Nature of the job	**:**
5.	**Date of Employment**	**:**
6.	**Length of service in years**	**:**
7.	**General Survey**	**:**
	Health	**: Good / Fair / Poor**
	Height	**: _____ Cms.**
	Weight	**: _____ Kg.**
8.	**Blood group**	**:**
9.	**Eye Vision**	**: Normal / Abnormal**
	Use of glass	**: Yes / No**
10.	**Hearing**	**: Normal / Abnormal**
11.	**Respiratory system and Chest Measurement**	
	Inspiration	**: _____ Cms.**
	Expiration	**: _____ Cms.**
	Respiration	**: _____ rate / min.**
	Remarks, if any	**:**
12.	**Cardiovascular system**	
	Pulse rate	**: _____ /min.**
	B.P.	**: _____ mm Hg.**
	Heart Sound	**:**
	ECG	**:**
	Remarks, if any	**:**
13.	**Abdomen Tenderness**	**: Yes / No**
14.	**Nervous system**	
	History of Fits	**: Yes / No**
	Epilepsy	**: Yes / No**
	Remarks on Mental Health	**:**

ANNEXURE : XXVI Contd..

15.	**Locomotors system**	**: Normal / Abnormal**
16.	**Skin condition**	**: Normal / Abnormal**
	Remarks on any skin disease noticed	**:**
17.	**Hernias**	**: Present / Absent**
18.	**Hydrocele**	**: Present / Absent**
19.	**Present complain, if any**	**:**
20.	**Summary of findings**	
	Heart disease	**:**
	Hypertension	**:**
	Diabetes	**:**
	T.B.	**:**
	Epilepsy	**:**
	Poisoning	**:**
	Others	**:**
	Occupational disease, if any	**:**
21.	**Recommendation, if any**	**:**
	For any further investigation	

Signature of the Employee **Signature of the Medical Officer**

Date : **Date :**

Form 30

[Prescribed under Rules 96]

Certificate of Fitness

Sl. No …… **Date ……**

I certify that I have personally examined (Name) …… Father's name …… ……. residing at …… (Address) who is desirous of being employed as …… Designation) in (process, department and factory) and that is age, as nearly as can be ascertained from my examination is …… Years, and that is my opinion fit/unfit for employment in the above mentioned factory as mentioned above

. **He may be produced for further examination after a period of ……**

. **The serial No. of the previous certificate is ……**

. **Signature/Left hand thumb impression of the person examined.**

Signature of the Employee **Signature of the Certifying Surgeon**

HEALTH RECORD RUNGTA MINES LIMITED (F.A.D)- 2021-22

SL NO.	NAME OF EMPLOYEE	AGE	SEX	SERVICE PERIOD	HEIGHT (CM)	WEIGHT(KG)	B.M.I	VISION	HEARING	BLOOD GROUP		B.P.(MM/HG)	P.R/MIN	E.C.G.	R.B.S (MG/DL)	REPORTS	REMARKS
										GROUP	Rh FACTOR						
1	SAKYA SINGH PAL	51	M	17-07-2006	164	86	31.9	NORMAL	NORMAL	A	POSITIVE	140/84	80	NORMAL		FIT	
2	SAROJ KUMAR BEHERA	39	M	06-12-2007	165	83	30.4	NORMAL	NORMAL	O	POSITIVE	160/110	80	NORMAL		HYPERTENSION	
3	ADITYA KUMAR PRADHAN	59	M	01-12-2007	167	70	25	NORMAL	NORMAL	O	POSITIVE	136/76	72	NORMAL		FIT	
4	MUNA BEHERA	44	M	10-12-2007	178	90	28.4	NORMAL	NORMAL	A	POSITIVE	128/72	72	NORMAL		HYPERTENSION	ON MEDICATION
5	MURALIDHAR SAHOO	49	M	01-02-2006	160	58	22.6	NORMAL	NORMAL	O	POSITIVE	122/76	86	NORMAL	109	FIT	
6	BASUDEV BEHERA	38	M	01-10-2005	158	65	26	NORMAL	NORMAL	O	POSITIVE	120/74	70	NORMAL		FIT	
7	SUSHANTA KUMAR SAHOO	40	M	01-10-2005	173	85	28.4	NORMAL	NORMAL	B	POSITIVE	112/64	86	NORMAL		FIT	
8	GYANA RANJAN PARIDA	38	M	01-10-2005	172	85	28.7	NORMAL	NORMAL	A	POSITIVE	118/78	72	NORMAL		FIT	
9	ASHOK KUMAR DEHUREE	50	M	01-04-2006	173	92	30.7	NORMAL	NORMAL	B	POSITIVE	136/76	86	NORMAL		HYPERTENSION	ON MEDICATION
10	DILLIP KUMAR PRADHAN	46	M	01-04-2006	179	83	28.9	NORMAL	NORMAL	O	POSITIVE	130/80	72	NORMAL		FIT	
11	NITYANANDA KHUNTIA	48	M	01-01-2008	158	60	24	NORMAL	NORMAL	B	POSITIVE	130/86	72	NORMAL		FIT	
12	GOBINDA CHANDRA NAYAK	46	M	02-06-2008	165	80	29.3	NORMAL	NORMAL	A	POSITIVE	120/78	72	NORMAL		DYSLIPIDEMIA	ON MEDICATION
13	KEDAR PRADHAN	45	M	11-12-2007	178	87	27.4	NORMAL	NORMAL	B	POSITIVE	118/78	72	NORMAL		FIT	
14	PURNA CHANDRA PRADHAN	57	M	11-12-2007	172	85	28.7	NORMAL	NORMAL	B	POSITIVE	140/100	78	NORMAL		HYPERTENSION	ON MEDICATION
15	ARABINDA SAMAL	43	M	11-12-2007	179	80	24.9	NORMAL	NORMAL	O	POSITIVE	118/78	78	NORMAL		FIT	
16	BINOD CHANDRA BEHERA	42	M	12-12-2007	159	70	27.6	NORMAL	NORMAL	O	POSITIVE	114/90	78	NORMAL		FIT	
17	BRAHAMANANDA DAS	58	M	08-12-2007	167	74	26.5	NORMAL	NORMAL	A	POSITIVE	136/86	76	NORMAL		FIT	
18	BIBHU PRASAD SAHOO	41	M	15-12-2007	162	71	27	NORMAL	NORMAL	B	POSITIVE	116/84	78	NORMAL		FIT	
19	ASWINI KUMAR BEHERA	51	M	11-12-2007	176	80	25.8	NORMAL	NORMAL	B	POSITIVE	138/72	72	NORMAL		HYPERTENSION	ON MEDICATION
20	SATRUGHNA PRADHAN	50	M	11-12-2007	163	55	20.7	NORMAL	NORMAL	O	POSITIVE	130/86	72	NORMAL		FIT	
21	SANTOSH KUMAR PRADHAN	48	M	11-11-2009	171	70	23.9	NORMAL	NORMAL	B	POSITIVE	134/68	72	NORMAL		FIT	
22	PRADEEP KUMAR NAYAK	43	M	01-09-2009	162	82	31.2	NORMAL	NORMAL	A	POSITIVE	130/84	92	NORMAL		HYPERTENSION & HYPERGLYCEMIA	ON MEDICATION
23	SANTOSH KUMAR MAHAKUD	39	M	01-09-2009	161	64	24.6	NORMAL	NORMAL	O	POSITIVE	126/78	72	NORMAL		FIT	
24	JAGABANDHU PRADHAN	43	M	01-09-2009	170	78	26.9	NORMAL	NORMAL	O	POSITIVE	124/84	78	NORMAL		FIT	
25	BISWAJIT DAS	32	M	01-09-2009	181	78	23.8	NORMAL	NORMAL	O	POSITIVE	110/60	92	NORMAL	200	HYPERGLYCEMIA	
26	ABHAYA NAYAK	42	M	01-09-2009	160	70	27.3	NORMAL	NORMAL	O	POSITIVE	110/82	72	NORMAL		FIT	
27	BASANT PRADHAN	56	M	01-09-2009	166	56	20.3	NORMAL	NORMAL	O	POSITIVE	134/90	56	NORMAL		HYPERTENSION	ON MEDICATION
28	GOPINATH PRADHAN	46	M	01-09-2009	164	68	25.2	NORMAL	NORMAL	O	POSITIVE	130/90	78	NORMAL		FIT	
29	RANJAN NAIK	46	M	01-09-2009	162	76	28.9	NORMAL	NORMAL	A	POSITIVE	120/70	78	NORMAL		FIT	
30	BIJAY KUMAR SAMAL	46	M	01-09-2009	159	57	22.5	NORMAL	NORMAL	B	POSITIVE	126/80	72	NORMAL		FIT	
31	PRATAP SAHOO	49	M	01-09-2009	162	55	20.9	NORMAL	NORMAL	O	POSITIVE	130/86	82	NORMAL		FIT	
32	KABIRAJ SAHOO	50	M	01-09-2009	174	76	25.1	NORMAL	NORMAL	A	POSITIVE	130/88	78	NORMAL		FIT	
33	DHANANJAY PRADHAN	32	M	01-09-2009	168	62	21.9	NORMAL	NORMAL	A	POSITIVE	110/74	84	NORMAL		FIT	
34	SURENDRA SAHOO	35	M	01-09-2009	168	65	23	NORMAL	NORMAL	O	POSITIVE	126/76	72	NORMAL		FIT	
35	HIMANSU KUMAR BEHERA	56	M	27-02-2013	171	84	28.7	NORMAL	NORMAL	A	POSITIVE	126/76	92	NORMAL	175	HYPERTENSION &HYPERGLYCEMIA	ON MEDICATION
36	DEBA PRASAD KABI SATPATHY	26	M	12-08-2019	175	115	37.5	NORMAL	NORMAL	B	POSITIVE	135/88	88	NORMAL		FIT	
37	DANDASI SURYA RAO	48	M	01-10-2020	168	76	26.9	NORMAL	NORMAL	B	POSITIVE	136/88	78	NORMAL	134	HYPERTENSION	ON MEDICATION
38	DHARMA NARAYAN PALAI	38	M	02-02-2021	162	72	27.4	NORMAL	NORMAL	B	POSITIVE	130/82	92	NORMAL		HYPERTENSION	ON MEDICATION
39	SIBA SANKAR SAHOO	37	M	05-02-2021	169	86	30.1	NORMAL	NORMAL	O	POSITIVE	140/86	92	NORMAL		FIT	
40	SOUMYABRATA DASH	36	M	10-02-2021	174	84	27.7	NORMAL	NORMAL	B	POSITIVE	118/78	72	NORMAL		FIT	
41	PABITRA KUMAR PARIDA	39	M	20-03-2021	170	85	29.4	NORMAL	NORMAL	O	POSITIVE	136/86	86	NORMAL	177	FIT	
42	BASUDEV DAS	43	M	29-04-2021	177	85	27.2	NORMAL	NORMAL	AB	POSITIVE	146/76	72	NORMAL		FIT	
43	LINGARAJ PADHI	48	M	29-04-2021	167	82	29.4	NORMAL	NORMAL	A	POSITIVE	122/72	92	NORMAL		FIT	
44	SANJEEB KUMAR BAHINIPATI	42	M	02-06-2021	175	74	24.1	NORMAL	NORMAL	O	POSITIVE	118/78	72	NORMAL		FIT	
45	MANOJ KUMAR BEHERA	43	M	05-06-2021	173	73	24.3	NORMAL	NORMAL	O	POSITIVE	110/80	72	NORMAL		FIT	

ANNEXURE : XXVII Contd..

SL NO.	NAME OF EMPLOYEE	AGE	SEX	SERVICE PERIOD	HEIGHT (CM)	WEIGHT(KG)	B.M.I	VISION	HEARING	BLOOD GROUP		B.P.(MM/HG)	P.R/MIN	E.C.G.	R.B.S (MG/DL)	REPORTS	REMARKS
46	NAVIN KUMAR	37	M	01-07-2021	165	78	28.6	NORMAL	NORMAL	B	POSITIVE	118/78	72	NORMAL		FIT	
47	ASUTOSH PRADHAN	29	M	05-08-2021	178	86	27.1	NORMAL	NORMAL	A	POSITIVE	118/78	62	NORMAL		FIT	
48	KUMAR PRADHAN	36	M	21-07-2021	161	68	26.2	NORMAL	NORMAL	B	POSITIVE	120/86	72	NORMAL		FIT	
49	BADAL BEHERA	21	M	06-08-2021	174	85	28	NORMAL	NORMAL	O	POSITIVE	118/76	72	NORMAL		FIT	
50	PRAMOD SHASTRI	37	M	10-08-2021	171	70	23.9	NORMAL	NORMAL	O	POSITIVE	128/88	72	NORMAL		FIT	
51	AJIT KUMAR RATH	40	M	16-08-2021	158	70	28	NORMAL	NORMAL	B	POSITIVE	118/78	78	NORMAL		FIT	
52	RASMI RANJAN SAMANTARAY	38	M	18-08-2021	161	72	27.7	NORMAL	NORMAL	O	POSITIVE	120/76	72	NORMAL		FIT	
53	ALOK MISHRA	27	M	20-08-2021	178	80	25.2	NORMAL	NORMAL	A	POSITIVE	120/66	78	NORMAL		FIT	
54	PREM RANJAN PRADHAN	36	M	23-08-2021	161	85	32.7	NORMAL	NORMAL	O	POSITIVE	130/80	78	NORMAL		FIT	
55	MANOJ KUMAR PATRA	38	M	06-09-2021	166	80	29	NORMAL	NORMAL	O	POSITIVE	136/76	72	NORMAL		FIT	
56	BISIKESHAN SAHOO	37	M	16-09-2021	170	84	29	NORMAL	NORMAL	O	POSITIVE	120/82	74	NORMAL		FIT	
57	SANJAYA KUMAR MOHAPATRA	30	M	29-09-2021	184	112	33	NORMAL	NORMAL	B	POSITIVE	142/78	96	NORMAL		FIT	
58	LAMBODAR PATRA	37	M	01-10-2021	162	75	28.5	NORMAL	NORMAL	A	POSITIVE	124/86	72	NORMAL	121	FIT	
59	SUBHASAKTI MOHANTY	42	M	08-10-2021	171	78	26.6	NORMAL	NORMAL	A	POSITIVE	118/76	72	NORMAL		HYPERTENSION & DYSLIPIDEMIA	ON MEDICATION
60	ABHISEK PANDA	31	M	13-12-2021	166	84	30.4	NORMAL	NORMAL	B	POSITIVE	118/78	72	NORMAL		FIT	
61	JAGANATH DASH	37	M	01-02-2022	180	90	27.7	NORMAL	NORMAL	O	POSITIVE	130/80	78	NORMAL		FIT	
62	DEBASISH PANDA	29	M	14-02-2022	173	84	28	NORMAL	NORMAL	AB	POSITIVE	122/68	72	NORMAL		FIT	
63	MRUTYUNJAY TRIPATHY	47	M	16-02-2022	176	85	27.4	NORMAL	NORMAL	O	POSITIVE	130/88	72	NORMAL		HYPERTENSION	ON MEDICATION
64	PURNA CHANDRA PRADHAN	48	M	21-02-2022	173	79	26.3	NORMAL	NORMAL	A	POSITIVE	110/70	90	NORMAL		FIT	
65	AJAY KUMAR DASH	52	M	12-12-2017	157	80	32.4	NORMAL	NORMAL	A	POSITIVE	128/68	72	NORMAL	281	HYPERGLYCEMIA	
66	SANJAY KUMAR SRIVASTAV	53	M	01-02-2022	168	76	26.9	NORMAL	NORMAL	B	POSITIVE	140/90	78	NORMAL	227	HYPERGLYCEMIA	
67	BALA BHADRA MOHAPATRA	50	M	2003	166	75	27.2	NORMAL	NORMAL	O	POSITIVE	154/86	80	NORMAL	147	HYPERGLYCEMIA	ON MEDICATION
CASUAL WORKER																	
1	KHAGESWAR PRADHAN	50	M	01-09-2009	174	75	24.7	NORMAL	NORMAL	A	POSITIVE	118/78	72	NORMAL		FIT	
2	BIMAL SAHOO	38	M	01-09-2009	168	74	26.2	NORMAL	NORMAL	B	POSITIVE	128/78	78	NORMAL		FIT	
3	SANTANU NAYAK	34	M	01-09-2009	167	72	25.8	NORMAL	NORMAL	O	POSITIVE	120/78	72	NORMAL		FIT	
4	TRIPURA PRADHAN	42	M	01-09-2009	154	55	23.1	NORMAL	NORMAL	B	POSITIVE	138/88	88	NORMAL		FIT	
5	NARENDRA BISWAL	34	M	01-09-2009	157	59	23.9	NORMAL	NORMAL	B	POSITIVE	128/84	80	NORMAL		FIT	
6	DIBAKAR SAHOO	35	M	01-09-2009	160	56	21.8	NORMAL	NORMAL	B	POSITIVE	130/90	74	NORMAL		FIT	
7	BUDHADEV NAIK	44	M	01-09-2009	170	55	19	NORMAL	NORMAL	B	POSITIVE	124/76	76	NORMAL		FIT	
8	PRADEEP PRADHAN	43	M	01-09-2009	160	72	28.1	NORMAL	NORMAL	O	POSITIVE	116/74	80	NORMAL		GASTRITIS	
9	NARENDRA PANDA	39	M	01-09-2009	166	80	29	NORMAL	NORMAL	A	POSITIVE	130/90	78	NORMAL		FIT	
10	BIKASH PRADHAN	31	M	14-03-2011	165	65	23.8	NORMAL	NORMAL	A	POSITIVE	132/96	76	NORMAL		DYSLIPIDEMIA	
11	RUDRA NARAYAN PRADHAN	30	M	14-03-2011	168	66	23.3	NORMAL	NORMAL	O	POSITIVE	118/78	72	NORMAL		FIT	
12	PARITOSH PRADHAN	41	M	14-03-2011	172	91	30.7	NORMAL	NORMAL	A	POSITIVE	124/84	92	NORMAL		FIT	
13	BIKASH CHANDRA NAYAK	39	M	14-03-2011	165	80	29.3	NORMAL	NORMAL	O	POSITIVE	128/70	72	NORMAL		FIT	
14	CHHABI NARAYAN SAHOO	45	M	01-04-2011	164	85	31.6	NORMAL	NORMAL	O	POSITIVE	140/82	72	NORMAL		HYPERTENSION	
15	DUSMANT SAHOO	33	M	17-03-2011	162	65	24.7	NORMAL	NORMAL	O	POSITIVE	128/78	78	NORMAL		FIT	
16	YUDHISTHIR NAYAK	54	M	17-03-2011	171	59	20.1	NORMAL	NORMAL	O	POSITIVE	118/78	72	NORMAL		FIT	
17	NARESH SAHOO	36	M	17-03-2011	160	62	24.2	NORMAL	NORMAL	B	POSITIVE	124/86	72	ABNORMAL		ANEMIA	ON MEDICATION
18	PANCHANAN SAHOO	32	M	17-03-2011	162	70	26.6	NORMAL	NORMAL	B	POSITIVE	120/76	88	NORMAL		FIT	
19	TAPAN SAHOO	33	M	17-03-2011	174	58	19.1	NORMAL	NORMAL	B	POSITIVE	110/62	82	NORMAL		FIT	
20	UGRASEN SAHOO	38	M	17-03-2011	159	64	25.3	NORMAL	NORMAL	B	POSITIVE	118/78	72	NORMAL		FIT	
21	KEDAR SAHOO	43	M	17-03-2011	167	58	20.7	NORMAL	NORMAL	O	POSITIVE	124/88	72	NORMAL		FIT	

ANNEXURE : XXVIII

Rungta Mines Limited

(FERRO ALLOYS DIVISION)

Works : Vill :- Tulasidiha, P.O. :- Meramandali, Dist. :- Dhenkanal - 759121, ODISHA, INDIA
Phone : (06732) 258171, Fax : (06732) 258171 Email : fad@rungtamines.co.in

Ref: RML/FAD /Water /22-23/ 610

Date: 28.02.2023

To
The Executive Engineer, Flood Cell,
Kamakhyanagar
Dist- Dhenkanal.

Subject: Details of peak and lean season discharge & Flood Level of Lingra Nalla with respect to Expansion of Ferro Alloys Division of M/s Rungta Mines Limited located at villages Tulasidiha in Dhenkanal District, Odisha.

Respected Sir,

We wish to submit that at present we are operating 1x9 MVA and x18 MVA Ferro alloys plant at villages Tulasidiha District Dhenaknal , Odisha.

Further, we have applied to MoEF&CC, New Delhi for Environmental Clearance for expansion of Ferro Alloys plant from 0.055 MTPA to 0.293 MTPA Ferro Alloys plant along with 150 MW captive power plant . Terms of Reference (TOR) accorded by MOEF&CC vide letter no. IA-J-11011/515/2022-IA.II(I) dated 01.12.2022 (copy enclosed).

We would like to say that the Ministry of Environment, Forest and Climate Change, Government of India requires, TOR point no VII and VII as

vii. In case if the project site is in vicinity of the water body, 50 meters from the edge of the water body towards the site shall be treated as no development/construction zone. If it's near the wetland, Guidelines for implementing Wetlands (Conservation and Management) Rules, 2017 may be followed.

viii. In case if the project site is in vicinity of the river, the industry shall not be located within the river flood plain corresponding to one in 25 years flood, as certified by concerned District Magistrate/Executive Engineer from State Water Resources Department (or) any other officer authorized by the State Government for this purpose as per the provisions contained in the MoEF&CC Office Memorandum dated 14/02/2022.

We request to kindly provide peak and lean season discharge & Flood Level of Lingra nalla for submission to MoEF&CC, Govt. of India for Environmental Clearance.

Thanking you

Yours faithfully,
For Rungta Mines limited
(Ferro Alloys Plant)

(P.K. Chaturvedi)
Vice President.

Enclosed: As above.

Basanta Kumar Sahu. Dy. Chief
O/O the EE
R.C.B.C
Dhenkanal
02.3.2023

OFFICE OF THE TAHASILDAR, ODAPADA
Letter No 1174 **/Dt** 09.03.23

To

The Vice President
M/s Rungta Mines Ltd.

Sub: Proposed site is not located on potentially mineable mineral deposit with respect to Expansion of Ferro Alloys Division of M/s Rungta Mines Limited located at village Tulasidiha in Dhenkanal District.

Sir,

With reference to the subject cited I am to say that as per your request Revenue Inspector, Motanga has been directed to go for a field visit to proposed site and submit a report regarding existence of potentially mineable mineral deposit sources if available and report compliance. Accordingly R.I Motanga has visited the spot and submitted his enquiry report(copy enclosed) which speaks that:

01. That the proposed site is pertaining to Khata No-48/24 of village Tulasidiha and has 182 nos of plots measuring an area of Ac 52.755.
02. That the proposed land is recorded in the name of M/s Manglal Rungta Ltd.
03. That the proposed site is coming under the compact patch of the company boundary.
04. That there is no permanent sairat source(potentially mineable reserve) available over the proposed land.
05. That the proposed land has already been converted to the kissam "Gharabari" (Industrial Purpose) vide OLR 8(A) Case No-56/2005.

This is for favour of your kind information and necessary action.

Yours faithfully

09.03.23

Tahasildar, Odapada

OFFICE OF THE REVENUE INSPECTOR, MOTANGA
Letter No 146 **/DT** 07/2/2023

To

The Tahasildar, Odapada

Sub: Proposed site is not located on potentially mineable mineral deposit with respect to Expansion of Ferro Alloys division of M/s Rungata Mines Limited located at village Tulasidiha in Dhenkanal District, Odisha.

Ref: Tahasil Office Memo No-550/Dt 04.02.2023

Madam,

With reference to the letter on the subject cited above I have gone on a field visit to the proposed site of M/s Rungta Mines Limited and the details of the findings are as follows:

01. That the proposed site is pertaining to Khata No-48/24 of village Tulasidiha and has 182 nos of plots measuring an area of Ac 52.755.
02. That the proposed land is recorded in the name of M/s Manglal Rungta.
03. The proposed site is coming under the compact patch of the company boundary.
04. That the there is no permanent sairat source (potentially mineable reserve) available over the proposed land.
05. That the proposed land has already been converted to the kissam "Gharabari" (Industrial Purpose) vide OLR 8(A) Case No-56/2005.

This is for favour of your kind information and necessary action.

Yours faithfully

7/2/2023

Revenue Inspector, Motanga

ANNEXURE : XXX

Rungta Mines Limited

(FERRO ALLOYS DIVISION)

Works : Vill :- Tulasidiha, P.O. :- Meramandali, Dist. :- Dhenkanal - 759121, ODISHA, INDIA
Phone : (06732) 258171, Fax : (06732) 258171 Email : fad@rungtamines.co.in

Ref. RML/FAD/WLCP/22-23/016 Dated 02.05.2023

To,

The Divisional Forest Officer,
Dhenkanal Forest Division,
Dhenkanal
Odisha.

Sub.: National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas Distance map from Ferro Alloys Division of M/s Rungta Mines Limited From 0.055 MTPA TO 0.293 MTPA Ferro Alloys Plant Along With 150 Mw CPP at Village Tulsidiha District Dhenkanal Odisha.

Ref.: TOR vide letter no. IA-J-11011/515/2022-IA.II(I) dated 01.12.2022.

Dear Sir,

With reference to the above cited subject, we wish to submit that as per the EIA notification September 2006, we have applied to MOEF&CC New Delhi for Environmental Clearance for above project. Terms of Reference (TOR) is accorded by MOEF&CC vide letter no. IA-J-11011/515/2022-IA.II(I) dated 01.12.2022.

In the Standard terms of reference for conducting Environment Impact Assessment study for metallurgical industry (ferrous and non-ferrous) and information to be included in EIA/EMP report in Condition No ***2(B) (Forest and wildlife related issues)*** it is mentioned "The ***projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas, the project proponent shall submit the map duly authenticated by Divisional Forest Officer showing the distance between the project site and the said areas.***

Please find attached herewith map prepared by CEMC, Bhubaneshwar showing National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, Eco-sensitive Zone and Eco-sensitive areas distance from the project site for your kind consideration for comply TOR.

We therefore, request you to kindly process the aforesaid map to facilitate us to comply with the above said condition of TOR in order to obtain Environmental Clearance for Expansion of Ferro Alloys plant from 0.055 MTPA to 0.293 MTPA along with 150 MW Captive Power Plant of M/s Rungta Mines Limited (Ferro Alloys Division) located at village Tulasidiha in Dhenkanal District, Odisha.

Thanking you,

Yours faithfully
M/s Rungta Mines Ltd.
(Ferro Alloys Division)

(P.K.Chatirvedi)
Director

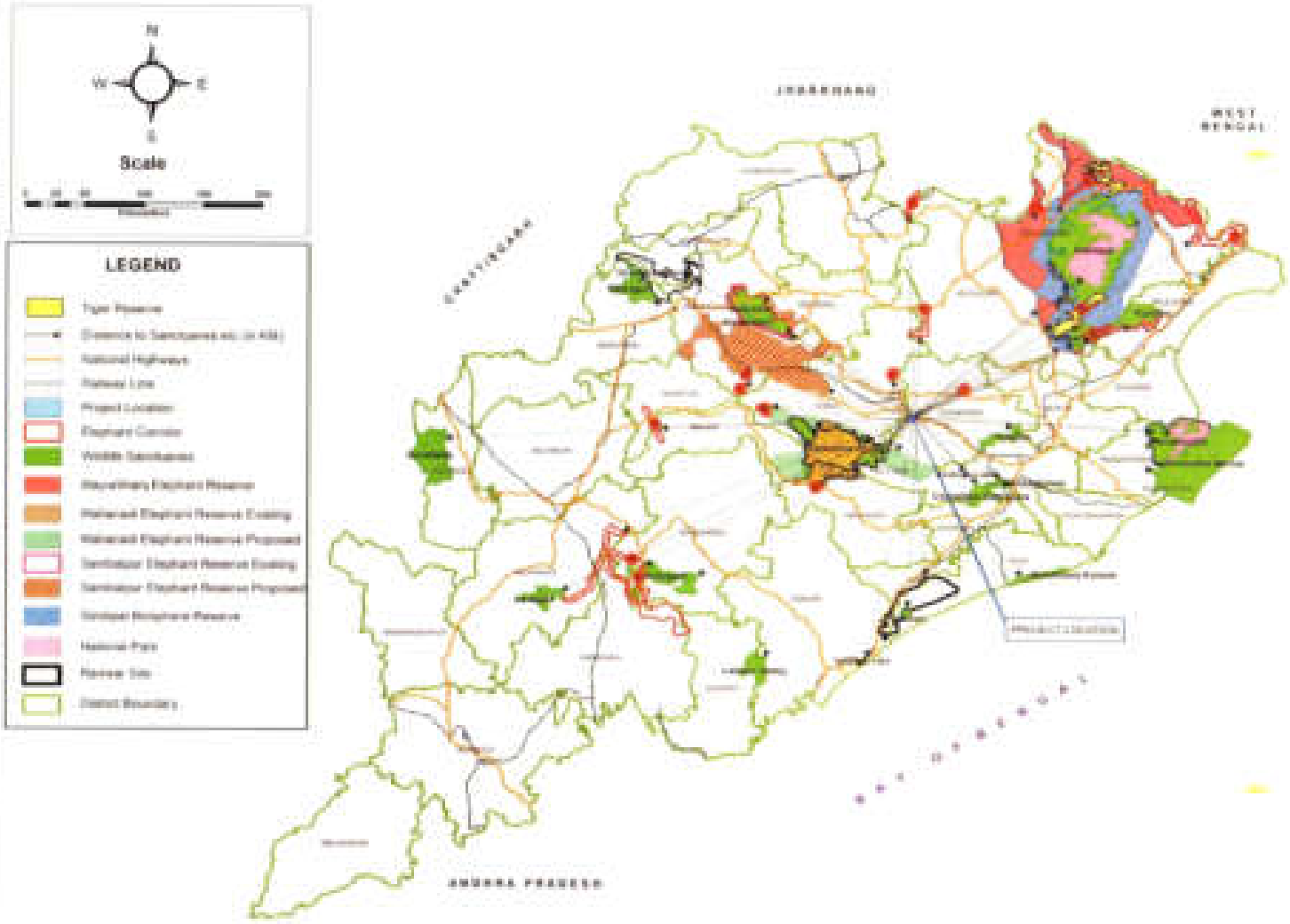
Enclosed: As above

Registered Office : 8A, Express Tower, 42A-Shakespere Sarani, Kolkata - 700 017, WEST BENGAL, INDIA
Phone : (033) 22816580, Fax : 91-33-22815380, CIN-U26911WB1962PLC025691
Email : rungta_cal@rungtamines.com

ANNEXURE : XXX Contd..

THE MAP OF ODISHA SHOWING THE DISTANCE OF PROJECT EXPANSION OF FERRO ALLOYS DIVISION OF M/S RUNGTA MINES LIMITED FROM 0.055 MTPA TO 0.293 MTPA FERRO ALLOYS PLANT ALONG WITH 150 MW CPP AT VILLAGE TULSIDIHA IN DHENKANAL DISTRICT, ODISHA FROM THE NEAREST NATIONAL PARKS/SANCTUARIES/ ELEPHANT RESERVES/TIGER RESERVES/BIOSPHERE RESERVE/ ELEPHANT CORRIDORS AND RAMSAR SITES

SL. NO.	ELEPHANT CORRIDOR	DISTANCE (IN KM)
1	Badampahar-Dhobaldubba	158.19
2	Badampahar-Kuruda	166.11
3	West Bengal Hindi Sahajpada	195.40
4 (a)	Sundergarh-Badbil	136.93
4 (b)	Sundergarh-Kuldiha	139.37
5	Telkoi-Pallahara	51.51
6	Keonjhargarh-Anandpur	135.31
7	Bhadrakhanja-Jenabil-Anandpur	33.07
8	Kaliapani-Anandpur	25.49
9	Hadgarh-Chandipur	70.91
10	Hadgarh-Haraji	85.86
11	Tol-Hadgarh	162.75
12	Hadgarh-Tarava-Kuliana	153.88
13	Hadgarh-Chandipur	160.99
14	Hadgarh-Dolabari	150.61
SL. NO.	**SANCTUARY**	**DISTANCE (IN KM)**
1	Bhitarkanika	144.89
2	Kuldihasal-Jenasole	121.31
3	Hadgarh	48.67
4	Badrama	110.02
5	Chilika (Nalaban)	123.27
6	Chandaka-Dampara	76.72
7	Debrigarh	173.99
8	Gahirmatha (Marine)	140.54
9	Hadgarh	106.11
10	Khalasuni	94.68
11	Kotkhai	143.68
12	Nandankanan	64.30
13	Satkosia	126.79
14	Sidheswar Gange	21.25
15	Sunabeda	280.22
16	Karlapat	241.24
17	Lakhari Valley	178.53
18	Rangagiri	165.45
19	Rupakote	58.72
SL. NO.	**NATIONAL PARK**	**DISTANCE (IN KM)**
1	Bhitarkanika National Park	156.38
2	Simlipal National Park (Proposed)	136.27
SL. NO.	**TIGER RESERVE**	**DISTANCE (IN KM)**
1	Simlipal Tiger Reserve	182.22
2	Satkosia Tiger Reserve	31.67
SL. NO.	**ELEPHANT RESERVE**	**DISTANCE (IN KM)**
1	Mayurbhanj Elephant Reserve	101.11
2	Mahanadi Elephant Reserve Existing	37.07
3	Mahanadi Elephant Reserve Proposed	21.91
4	Sambalpur Elephant Reserve Existing	91.13
5	Sambalpur Elephant Reserve Proposed	53.07
SL. NO.	**BIOSPHERE RESERVE**	**DISTANCE (IN KM)**
1	Simlipal Biosphere Reserve	98.15
SL. NO.	**RAMSAR SITES**	**DISTANCE (IN KM)**
1	Chilika Lake	101.82
2	Anshupa Lake	45.39
3	Tampara Lake	157.68
4	Bhitarkanika	149.48
5	Satkosia Gorge	21.25
6	Hirakud Reservoir	157.19



REFERENCE MAP
WILDLIFE ODISHA BOOK



ANNEXURE : XXXI

सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत
CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. LT02-CCD/22/79

Date: 24.01.2023

Name & Address of the Party:

Mr. G. P. Sharma, AGM (Env.)
M/s. Rungta Mines Limited
Rungta Centre
Dist-West Singhbhum
JHARKHAND- 833 201
(Mob. No.): 9431133291

Sample Details:

1.One Silico-manganese slag Sample

Date of Receiving: 12.01.2023
Date of Conducting Test: 13.01.2023
Date of Completion of Test: 19.01.2023
Method Adopted/ Standard:

(a) Leaching study 1- Toxicity Characteristic Leaching Procedure (TCLP) study as per US-EPA method 1311.

(b) Leaching study 2- Waste Extraction Test (WET) Procedure given in Appendix II of section 66261 of Title 22 of California Code Regulations (CCR) to compare with Soluble Threshold Limit Concentration (STLC).

Analysis of leaching solutions by AAS, ICP-OES, UV visible Spectrophotometer & Ionometry.

Detail Report:

Following data tables are enclosed:

Table-1. Concentration of Toxic & heavy metals in Silico-manganese slag sample.

Table-2. Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Silico-manganese slag conducted as per US-EPA method 1311.

Table-3. Concentrations of metal ion constituents in TCLP or WET Procedure solutions of Silico-manganese slag slag sample.

24/01/2023
(Dr. J. Das)
Principal Technical Officer
Central Characterization Dept.

24/01/23
(Dr. B. Nayak)
Chief Scientist
& Head, CCD

N.B.:- The samples are not drawn by CSIR-IMMT. Liability, if any, arising on the institute in connection with the testing shall be subject to ceiling of amount received by the institute from the client. The report should not be interpreted in part.

सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत
CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. LT02-CCD/22/79 **Date: 24.01.2023**

Table-1. Concentration of Toxic & heavy metals in Silico-manganese slag sample.

Sl. No.	Parameter	Unit	Concentration in Slag Sample
1	Mn	%	13.71
2	Fe	%	0.202
3	Zn	mg/Kg	26.81
4	Cu	mg/Kg	23.28
5	Pb	mg/Kg	5.69
6	Ni	mg/Kg	3.49
7	Cd	mg/Kg	BDL
8	Co	mg/Kg	11.01
9	Cr	mg/Kg	46.16
10	Hg	mg/Kg	7.62
11	As	mg/Kg	63.44

24/01/2023
(Dr. J. Das)
Principal Technical Officer
Central Characterization Dept.

24/01/23
(Dr. B. Nayak)
Chief Scientist
& Head, CCD

सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत
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Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. LT02-CCD/22/79 **Date: 24.01.2023**

Table-2. Experimental variables for Toxicity Characteristic Leaching Procedure (TCLP) study of Silico-manganese slag sample conducted as per US-EPA method 1311.

Sl. No.	TCLP study Variables	Variable Data
		Slag sample
1	TCLP study method	US-EPA Method-1311
2	Sample type	Gravel
3	Sample particle size taken for leaching	< 9 mm
4	Initial pH of sample	9.45
5	pH after HCl + heat	2.78
6	Extraction fluid used	Extraction fluid -1
7	pH of Extraction fluid	4.95
8	Sample taken for leaching, gm	50
9	Volume of extraction fluid used, ml	1000
10	Liquid/solid ratio	20:1
11	Head space	10%
12	Extraction Temperature °C	28
13	Extraction Time, hour	18
14	Filter	Glass micro fiber, Whatman GF/C
15	Washing of filters	With dil. HNO_3 and distilled water
16	pH of recovered extraction fluid	4.71

24/01/2023
(Dr. J. Das)
Principal Technical Officer
Central Characterization Dept.

24/01/23
(Dr. B. Nayak)
Chief Scientist
& Head, CCD

सीएसआईआर - खनिज एवं पदार्थ प्रौद्योगिकी संस्थान
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद)
भुवनेश्वर-751013, ओडिशा, भारत
CSIR - INSTITUTE OF MINERALS & MATERIALS TECHNOLOGY
(Council of Scientific & Industrial Research)
Bhubaneswar - 751013, Odisha, INDIA

TEST REPORT

Ref. No. LT02-CCD/22/79 **Date: 24.01.2023**

Table-3. Concentrations of metal ion constituents in TCLP or WET Procedure solutions of Silico-manganese slag sample.

Sl. No.	Parameter	Concentrations in TCLP or WET* leaching solutions of Slag test sample, mg/L	Waste constituents concentration limits based on TCLP or STLC. Gazette of India, Extraordinary, Schedule-II, mg/L
1	Hg	0.002	0.2
2	As	0.014	5.0
3	Total Cr	0.065	5.0
4	Cr (VI)	0.037	5.0
5	Cd	BDL	1.0
6	Pb	BDL	5.0
7	Mn	45.65	10.0
8	Ba	0.98	100
9	Se	0.009	1.0
10	Ag	0.006	5.0
11	Co*	0.038	80.0
12	Cu*	0.0035	25.0
13	Ni*	0.024	20.0
14	Zn*	0.11	250
15	Sb*	0.036	15.0
16	Mo*	0.008	350
17	V*	0.030	24.0

*Metal ion concentrations are measured in WET procedure leaching solutions and other metal ions are analyzed in TCLP leaching solutions as per MOEF guidelines.

24/01/2023

(Dr. J. Das)
Principal Technical Officer
Central Characterization Dept.

24/01/23

(Dr. B. Nayak)
Chief Scientist
& Head, CCD

ANNEXURE : XXXII

FOUR PAGE EXTRACT FROM BUSINESS TRANSFER AGREEMENT



पश्चिमबङ्गा पश्चिम बंगाल WEST BENGAL L 407320

This **Business Transfer Agreement** ("**Agreement**") is entered into on 1st Day of August 2020, at Kolkata by and between:

M/s Mangilall Rungta, a partnership firm registered under the Indian Partnership Act, 1932 and whose head office is at 8A, Express Tower,42A, Shakespeare Sarani, Kolkata-700 017, West Bengal, India (hereinafter referred to as the "**Seller**" which expression shall unless repugnant to the context thereof, be deemed to mean and include its successors and permitted assigns) of the **One Part**.

AND

M/s Rungta Mines Limited, a company incorporated under the Companies Act, 1956 having its registered office at 8A, Express Tower,42A, Shakespeare Sarani, Kolkata-700 017, West Bengal, India (hereinafter referred to as the "**Purchaser**" which expression shall unless repugnant to the context thereof, be deemed to mean and include its successors and permitted assigns) of the **Other Part**.

(Unless the context requires otherwise, the Seller and the Purchaser are hereinafter collectively referred to as '**Parties**' and individually as a '**Party**'.)

WHEREAS

a) The Purchaser is *inter alia* engaged in business of manufacturing of steel and power with its steel plants operational at 3 locations in the state of Jharkhand and Odisha and purchases ferro-alloys from markets for its steel making.

b) The Seller was *in the business of* mining of manganese ore etc. Further, the Seller is also engaged in manufacturing of Ferro Alloys (hereinafter referred to as Ferro Alloys Division). The manufacturing of ferro alloy is undertaken at a factory located in Tulsidiha, Meramandali, District: Dhenkanal, Odisha.

MANGILALL RUNGTA
Partner

For RUNGTA MINES LIMITED
Director

c) The mining lease of the seller has lapsed on 31.03.2020 and the mine has been auctioned off and the seller was not successful in winning the mines, the seller thinks it proper to sell its Ferro Alloy Division (defined hereinafter in Article 1.1 (vi)) to purchaser as it is a purchaser of ferro alloys for their steel manufacturing activities.

d) The Parties desire that the Seller shall sell/ transfer/ convey the Ferro Alloy Division to the Purchaser, and the Purchaser shall purchase and acquire the Ferro Alloy Division from the Seller, on a going concern basis by means of a "slump sale" (as defined in Section 2 (42C) of the Income Tax Act, 1961), for a lump sum consideration and subject to the other terms and conditions specified in this Agreement.

e) The Seller has therefore agreed to enter into this Agreement for the purpose to sell, transfer and convey the Ferro Alloy Division to the Purchaser, subject to the terms and conditions contained herein.

NOW THEREFORE, THE PARTIES, INTENDING TO BE LEGALLY BOUND HEREBY AGREE AS FOLLOWS:

ARTICLE 1 – DEFINITIONS AND INTERPRETATION

1.1 Definitions

In this Agreement, unless the context requires otherwise, the following terms and expressions shall have the meanings set forth below:

i) **"Agreement"** shall mean this Agreement along with all Annexure(s) and/or Schedules and/or Appendices, if any, attached hereto and shall include any amendments, addendums or supplements thereto, executed by the Parties, in writing, after the Agreement Effective Date.

ii) **"Applicable Laws"** shall mean and include the laws of India as may be in force from time to time, whether in force by way of statutory enactments, rules, regulations or otherwise.

iii) **"Agreement Effective Date"** shall mean the date from which this Agreement will be effective i.e. 1st August 2020.

iv) **"Assumed Contracts"** mean contracts relating to the Ferro Alloy Division that are proposed to be novated in favour of the Purchaser with effect from the Agreement Effective Date pursuant to this Agreement and as set forth in Schedule 2 of this Agreement.

v) **"Books and Records"** shall mean books and statements of accounts, files, papers, data, manuals, catalogues and other documents and records, including the originals thereof relating to the Ferro Alloy Division, which are to be transferred to the Purchaser in accordance with this Agreement.

vi) **"Ferro Alloy Division"** means the business undertaking of the Seller engaged in the Ferro Alloy Manufacturing Business consisting of the following:

a) Immovable Property of the Ferro Alloy Division as set forth in Schedule 1 of this Agreement;

MANGILALL RUNGTA
Partner

For RUNGTA MINES LIMITED
Director

ANNEXURE : XXXII Contd.

MANGILALL RUNGTA, FERRO ALLOYS DIVISION, TULASIDIHA, MERAMANDALI, DHENKANAL

Schedule - I

A. Land

Sl.No.	Deed No	Address	Area (In Acre)
1	253	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.35
2	254	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.67
3	255	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.24
4	256	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.35
5	257	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	1.44
6	258	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	1.03
7	259	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.32
8	262	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	13.78
9	264	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	2.77
10	271	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	1.920
11	272	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.02
12	273	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.48
13	274	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.14
14	275	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	2.17
15	276	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.26
16	277	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	2.04
17	278	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.33
18	279	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	5.725
19	329	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.42
20	330	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.32
21	402	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	2.14
22	425	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	2.07
23	570	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.24
24	678	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	1.06
25	686	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.19
26	687	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.76
27	690	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.54
28	1046	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.38
29	1047	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.15
30	1048	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.45
31	1049	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.36
32	1050	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	1.40
33	1054	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.025
34	1547	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.38
35	1548	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.37
36	1549	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.40
37	1550	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.41
38	1551	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	1.185
39	1552	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.16
40	1618	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.16
41	1619	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.31
42	1620	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.31
43	1621	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.410
44	1622	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.31
45	1647	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	2.06
46	1689	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.56
47	1992	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.40
48	1993	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.095
49	2442	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.64
50	2443	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.33
51	2950	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.635
52	3622	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.595
53	3624	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.15
54	3626	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.38
55	3647	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.40

MANGILALL RUNGTA

Partner

For RUNGTA MINES LIMITED

Director

ANNEXURE : XXXII Contd.

MANGILALL RUNGTA, FERRO ALLOYS DIVISION, TULASIDIHA, MERAMANDALI, DHENKANAL

Schedule - I

56	3783	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.105
57	3973	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	2.53
58	4048	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.38
59	4094	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.20
60	4160	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.10
61	4163	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.08
62	4164	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.64
63	4180	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.39
64	4237	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.29
65	4238	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.16
66	4239	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.48
67	4258	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.075
68	4292	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.24
69	4823	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.30
70	4836	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.71
71	4844	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.18
72	4901	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.15
73	4931	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.130
74	1393	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.52
75	1394	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.80
76	1705	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.20
77	2066	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.82
78	2520	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.49
79	2811	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.045
80	2923	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	1.820
81	3494	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.83
82	3548	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	1.64
83	4885	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.3
84	4886	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.31
85	11306	Mangilall Rungta (FAD) Tulasidiha, Meramandali Dhenkanal - 759121	0.60

B. Civil Structure and Factory Building

Sl. No.	Types of Building	Description	Area in Sqft./ Length in Rmt.
1	Boundary Wall & Main Gate		7000 Rmt.
2	Time Office & Security Room	Gr.Floor	300 Sq. Ft.
3	Adminsrative G+2 Office Building	Gr.Floor	4900 Sq. Ft.
		1st Floor	4900 Sq. Ft.
		2nd Floor	4900 Sq. Ft.
4	Store Complex	Gr.Floor	1200 Sq. Ft.
5	Two Wheeler Stand	Gr.Floor	2610 Sq. Ft.
6	Temple		4180 Sq. Ft.
7	Four Wheeler Stand	Gr.Floor	1160 Sq. Ft.
8	Weigh Bridge	Gr.Floor	345 Sq. Ft.
9	Security Barrack	Gr.Floor	6864 Sq. Ft.
10	Security Toilet block	Gr.Floor	380 Sq. Ft.
11	Project Office Block	Gr.Floor	2324 Sq. Ft.
12	Laboratory	Gr.Floor	1848 Sq. Ft.
13	Mechenical Work Shop	Gr.Floor	2772 Sq. Ft.
14	Cement Godown	Gr.Floor	4256 Sq. Ft.
15	StoreRooms	Gr.Floor	3486 Sq. Ft.
16	Elecrical Sub-Station	Gr.Floor	2670 Sq. Ft.
17	Labour Shed(Inside)	Gr.Floor	1320 Sq. Ft.
18	Labour Shed(Outside)	Gr.Floor	7500 Sq. Ft.
19	Staff Cateen	Gr.Floor	2108 Sq. Ft.
20	Internal Road		104000 Sq. Ft.

MANGILALL RUNGTA

Partner

For RUNGTA MINES LIMITED

Director

ANNEXURE : XXXIII

MATERIAL SAFETY DATA SHEET[1]

PRODUCT NAME: Manganese Ore

USES: In production of Ferro-Manganese, Silico-Manganese

A.	**PHYSICAL DESCRIPTION & PROPERTIES**	
1.	**Appearance**	Dark grey to black solid
2.	**Boiling Point/ Melting Point**	Not Available
3.	**Specific Gravity**	4700- 5900 kg/m^3
4.	**Solubility in Water**	Insoluble
B.	**Composition**	
1.	**Name**	Manganese Dioxide (MnO_2) and Crystalline Silica (SiO_2)
C.	**HEALTH EFFECTS**	
1.	**Inhalation**	Toxic with chronic exposure. Over-exposure may result in irritation of the nose, throat and respiratory system. Chronic exposure may result in manganese poisoning with symptoms resembling Parkinsonism. Prolonged and inhalation of quartz (crystalline silica) may result in lung disease (silicosis)
2.	**Ingestion**	Moderate toxicity, Ingestion is not anticipated with normal use, however chronic over-exposure to manganese may result in manganese poisioning (manganism), a progressively disabling brain disease, which in its latter stages resembles Parkinsons disease.
3.	**Skin**	Low irritant, Prolonged and repeated exposure to dust may result in irritation and dermatitis.
4.	**Eyes**	Low irritant, Exposure may result in irritation and lacrimation
D.	**PRECAUTIONS FOR USE**	
1.	**EXPOSURE STANDARDS**	Manganese Dioxide = 1 mg/m^3 as Mn Crystalline Silica = 0.1 mg/m^3
2.	**MANUFACTURERS' RECOMMENDATIONS**	Use safe work practices to avoid dust inhalation. Chronic over-exposure to manganese dust at high levels may result in manganese poisoning (manganism); a progressively disabling brain disease, which in its latter stages resembles Parkinsons disease. Crystalline quartz is classified as carcinogenic to humans (IARC Group 1). Chronic exposure may cause lung fibrosis (silicosis).

[1] Source: https://studylib.net/doc/7666597/case-study-4-msds-information-for-manganese-ore accessed on 30.11.2022

ANNEXURE : XXXIII Contd..

E.	**ENGINEERING CONTROLS**	
	Do not inhale dust/powder. Use with adequate natural ventilation. Where a dust inhalation hazard exists, mechanical extraction ventilation is recommended. Maintain dust levels below the recommended exposure standard.	
F.	**PERSONAL PROTECTION**	
1	**Skin:**	In areas of heavy contamination wear gloves and disposable
2.	**Eyes:**	Use dustproof goggles
3.	**Respiratory:**	Where exposures exceed the exposure standard wear a P1 (particulate) respirator. Where exposures are excessive wear a P2 (particulate) respirator or an air-supplied respirator.
4.	**Flammability:**	Not flammable
5.	**Hazardous Decomposition Product:**	May evolve toxic gases when heated to decomposition.
G.	**SAFE HANDLING INFORMATION**	
	Before use, carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas (eg if container is damaged). Store in cool, dry, well ventilated area, removed from organics, oxidising agents. hydrogen sulphide, heat sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.	

ANNEXURE : XXXIII Contd..

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: Metallurgical Coke & Coke Breeze

SECTION 1 : IDENTIFICATION		
1	**Product Identifier**	Coke Products
2	**Other means of Identification:**	Metallurgical Coke, Coke Breeze
3	**Recommended use and restrictions on use:**	Use as a fuel for furnaces
SECTION 2: HAZARD CLASSIFICATION AND PRECAUTIONARY STATEMENT(S)		
1	**Hazard Classification**	Carcinogenicity -1A Single Target Organ Toxicity (STOT) Repeat Exposure -1 Specific Target Organ Toxicity (STOT) Single Exposure -1 Eye irritation – 2A Skin irritation - 2 Combustible Dust
2	**Prevention**	1. Do not breathe gas/fumes/vapor/dusts. 2. Avoid contact with skin and eyes. 3. Wear protective gloves / protective clothing / eye protection / face protection. 4. Avoid exposure, obtain special instructions before use.
3	**Response**	1. If exposed, concerned or feel unwell: Get medical advice/attention. 2. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If eye irritation persists: Get medical advice/attention. 3. If on skin: Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse. 4. If swallowed: Call a doctor/physician if you feel unwell. Rinse mouth
4	**Storage/Disposal**	Dispose of contents in accordance with state and local regulations.

ANNEXURE : XXXIII Contd..

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS		
1	**Chemical Name**	Carbon, Ash, Water, Aluminum Oxide, Silicon Dioxide (Quartz), Iron Oxide, Volatile Matter (<0.01% CTPV)
SECTION 4: FIRST AID MEASURES		
4 (a)	**Description of necessary measures:**	If exposed, concerned or feel unwell: Get medical advice/attention.
	Inhalation:	If inhaled: Remove person to fresh air and keep comfortable for breathing. Seek medical advice if discomfort persists.
	Eye Contact:	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If eye irritation persists: Get medical advice
	Skin Contact:	Wash thoroughly after handling. Wash with plenty of soap and water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse.
	Ingestion:	If swallowed: Get medical advice/attention. Call a poison center or doctor/physician if you feel unwell.
4(b)	**Most important symptoms/effects, acute and delayed (chronic)**	
	Primary Entry Routes:	Excessive total particulate exposure may cause irritation to the eyes, skin and respiratory tract. Operations which generate high dust concentrations may result in the following effects if exposures exceed recommended limits as listed in Section 8. Possible Cancer Hazard.
	Inhalation:	May cause upper respiratory irritation. Prolonged inhalation of crystalline silica may cause silicosis, chronic lung disease or death.
	Eye:	Eye contact with dry dust can cause abrasive irritation or eye damage.
	Skin:	Skin contact with dust may cause irritation or sensitization, possibly leading to dermatitis. Skin contact with dusts may cause physical abrasion.
	Ingestion:	Do not take internally. May cause nausea and/or vomiting.

ANNEXURE : XXXIII Contd..

SECTION 5: FIRE-FIGHTING MEASURES		
5(a)	**Suitable (and unsuitable) Extinguishing Media:**	Steam, water fog, dry chemical, sand or carbon dioxide. Small fires – Foam, CO2, Dry Chemical, Water Spray. Large Fires – Water spray, fog or foam.
5(b)	**Specific Hazards arising from the chemical:**	Not applicable for solid product. When burned, toxic smoke or vapour may be emitted including, oxides of carbon, metal oxides and other toxic vapour. Coke dust may form combustible mixtures with air.
5(c)	**Special protective equipment and precautions for fire-fighters:**	Full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection.
SECTION 6: ACCIDENTAL RELEASE MEASURES		
6(a)	**Personal Precautions, Protective Equipment and Emergency Procedures:**	Use only outdoors. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust.
6(b)	**Methods and materials for containment and clean up:**	Dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, provincial, state, and local regulations.
SECTION 7: HANDLING AND STORAGE		
7(a)	**Precautions for safe handling:**	Avoid generating dust. High concentrations of airborne particulates should be evaluated and controlled as necessary; local exhaust ventilation should be used to control the emission of air contaminants. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use only outdoors or in well ventilated areas. Practice good housekeeping. Avoid skin contact and breathing dust. Do not eat, drink or smoke

		when using this product.
7(b)	**Conditions for safe storage, including any incompatibilities:**	Whenever feasible, store locked up. Avoid heat and flames.
SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION		
8(a)	**Appropriate Engineering Controls:**	Use controls as appropriate to minimize exposure to dusts during handling operations. Provide general or local exhaust ventilation systems to minimize airborne concentrations in confined areas. Provide sufficient general/local exhaust ventilation in pattern/volume to control inhalation exposures below current exposure limits. Emergency eye wash stations and deluge safety showers should be available in the work area.
SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES		
9 (a)	**Appearance (physical state, color, etc):**	Dark grey to black, Solid
9 (b)	**Odor:**	Odorless
9 (c)	**Flash Point:**	>205 0F
9 (d)	**Flammability (solid, gas):**	Combustible
9 (e)	**Solubility:**	Insoluble
9 (f)	**Relative Density:**	Specific Gravity (1.6)
SECTION 10: STABILITY AND REACTIVITY		
10 (a)	**Chemical Stability:**	Stable under normal storage and handling conditions.
10 (b)	**Conditions to Avoid:**	Ignition sources in dusty environments. Storage with incompatible materials
10 (c)	**Incompatible Materials:**	Strong acids and basis.
10 (d)	**Hazardous Decomposition Products:**	Oxides of carbon, sulfur and aromatic hydrocarbons may be released at high temperature

ANNEXURE : XXXIII Contd.

MATERIAL SAFETY DATA SHEET[1]

PRODUCT NAME: Chrome Ore

USES: In production of Ferro-Chrome, Silico-Chrome

A.	**PHYSICAL DESCRIPTION & PROPERTIES**	
1.	**Appearance**	Usually black, sometime shows variation form iron-black to brownish□black with some brown streaks
2.	**Boiling Point/ Melting Point**	Not Available/ >3400°F
3.	**Bulk density**	4405 kg/m^3
4.	**Solubility in Water**	Not readily soluble
B.	**Composition**	
1.	**Name**	Ferrochromite (III)(Cr2FeO4)
C.	**HEALTH EFFECTS**	
1.	**Inhalation**	Overexposure by inhalation of airborne particulate, dust or fumes is irritating to the nose, throat and respiratory tract. Inhalation of excessive levels of dust or fumes may be harmful.
2.	**Ingestion**	Ingestion is an unlikely route of exposure; no hazard in normal industrial use. Small amounts swallowed during normal handling operations are not likely to cause injury. However, if ingested in sufficient quantity may cause injury such as gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting, abdominal pain and diarrhea.
3.	**Skin**	Prolonged or repeated contact may cause slight to moderate skin irritation.
4.	**Eyes**	Contact with particulate may cause slight to moderate eye irritation. Abrasive action of dust particulate can damage eye.
D.	**PRECAUTIONS FOR USE**	
1.	**EXPOSURE STANDARDS**	1 mg/m^3 as per OSHA
2.	**MANUFACTURERS' RECOMMENDATIONS**	Use safe work practices to avoid dust inhalation. Chronic over-exposure to manganese dust at high levels may result in Chrome poisoning
E.	**ENGINEERING CONTROLS**	
	If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limits	
F.	**PERSONAL PROTECTION**	
1	**Skin:**	Wear clothing sufficient to cover the skin, safety shoes and leather gloves for hand protection against dry material.

[1] Source: http://calumite.com/pdfs/MSDSIronChromite2011.pdf accessed on 24.04.2023

ANNEXURE : XXIII Contd..

2.	**Eyes:**	Corrosive to eyes. Wear protective safety goggles when dust generation is likely
3.	**Respiratory:**	Use NIOS/MSHA approved respiratory protection (air purifying or air supplying) when concentrations are above exposure limit value. A respiratory protection program that meets OSHA 29 CFR part 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respirator.
4.	**Flammability:**	Not flammable
5.	**General Hygiene Considerations:**	Wash thoroughly after using product. Wash contaminated clothing. Wash hands before eating or drinking.
G.	**SAFE HANDLING INFORMATION**	
	Before use, carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas (eg if container is damaged). Store in cool, dry, well ventilated area, removed from organics, oxidising agents. heat sources and foodstuffs. Keep container closed when not in use. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.	

MATERIAL SAFETY DATA SHEET FOR HIGH SPEED DIESEL

1.	Physical State	Liquid
2.	Colour	Straw red
3.	Specific Gravity	0.86
4.	Flash Point °C	66
5.	Boiling Point °C	340
6.	Auto Ignition Temperature °C	358
7.	Vapor Pressure	< 1mm
8.	Solubility	NO
9.	Explosive Limit(% volume in air)	5-7

A. POTENTIAL HEATH EFFECTS

- **Inhalation:-** Irritation of the upper respiratory tract and eyes, with possible euphoria, dizziness, headache, disco ordination, ringing in the ears, convulsion, coma, and respiratory arrest.
- **Ingestion:-** Irritation of the mucous membranes of the throat, esophagus and stomach which may result in nausea and vomiting; central nervous system depression may occur, if absorbed (see inhalation symptoms above). If aspirated, chemical pneumonitis may occur with potentially fatal result. Possible kidney and liver damage may be delayed.
- **Skin Contact:-** Defatting of the skin may occur with continue and prolonged contact. Irritation and burning sensation may occur on exposure to the liquid or mists.
- **Eye Contact:-** Severe burning sensation with temporary irritation and swelling of the lids.

B. FIRSTAID MEASURES

- **Inhalation:-**Get person out of contaminated area to fresh air. If breathing has stopped resuscitate and administer oxygen if readily available. **SEEK MEDICAL ATTENTION IMMEDIATELY.**
- **Ingestion:-**Never give anything by mouth to an unconscious person. If swallowed, do not induce vomiting. If vomiting occurs spontaneously, keep air way clear,SEEK MEDICAL ATTENTION IMMEDIATELY.
- **Skin Contact:-**Wash contaminated areas with plenty of soap and water. A soothing ointment may be applied to irritated skin thoroughly cleaning. Remove contaminated clothing and footwear.
- **Eye Contact:-** Immediately flush eyes with large amount of water for at least 15 minutes holding lids to ensure flushing of the entire eye surface. SEEK IMMEDIATE MEDICAL ATTENTION.
- **Note to Physician:-** Do not induce vomiting, use gastric lavage only. Aspiration of liquid into the lungs could result in chemical pneumonitis. Use of adrenaline is not advised. Treat symptomatically.

C. FIRE FIGHTING MEASURES

- Fire Fighting Instructions:- Use water fog, CO_2, foam, dry chemical or Halon to extinguish. Keep personnel removed from and up-wind of fire. Cool adjacent structures and storages drums with water spray. Evacuate area. Prevent runoff from fire control dilution entering streams or drinking supply.

D. HANDLING AND STORAGE

- Store only in approved containers. Protect containers against physical damage. Outside or detached storage is preferred. Separate from oxidizing materials. Store in cool, well-ventilated area of non-combustible construction away from possible sources of ignition. Keep away, from incompatible materials.

- **Product Use:-**This product is intended for use as a fuel in engines and heaters designed for kerosene or diesel fuels, and for use in engineered processes. Use in other application may result in higher exposure and require additional controls.

M/s. Rungta Mines Limited (Ferro Alloys Division), Tulasidiha, Dhenkanal

5. PERSONAL PROTECTION

- Airborne Exposure limits: None established.
- **Ventilation System:** Not expected to require any special ventilation.
- **Personal Respirator:** Respiratory protection is not required unless product is sprayed or heated. Use approved respiratory protection following manufacturer's recommendations where spray, mists, or vapors may be generated. Supplied air respiratory protection is required for IDLH areas.
- **Skin Protection:** Wear protective glove and clean body-covering clothing.
- **Eye Protection:** Face shield and goggles or chemical goggles should be worn where mist or spray may be generated, and where splashing occurs. Shower and eyewash facilities should be accessible.

7. ACCIDENTAL RELEASE MEASURES

- If material is spilled, steps should be taken to contain liquid and prevent discharges to streams or sewer systems and control or stop the loss of volatile materials to the atmosphere. Spills or releases should be reported, if required to the appropriate local, state and federal regulatory agencies.
- **Small Spills:** Remove ignition sources. Absorb spilled material with non-combustible materials such as cat litter, dirt, sand, or petroleum as sorbent pads/pillows. Do not use combustible materials like rags, wood chips, or saw dust. Remove contaminated materials to an appropriate disposal container.
- **Large Spills:** Remove ignition sources. Dike spill area with sand or dirt to contain material and cover sewers/drains. Remain upwind and keep unnecessary people away. Contact trained emergency response team for cleanup. Remove liquid using grounded suction pumps. Isolate hazard area and deny entry.

8. TRANSPORTATION

- It is transported as combustible liquid following the transport rules of hazardous chemicals.

MATERIAL SAFETY DATA SHEET
DURALIFE® TRANSFORMER OIL- ALL GRADES

MSDS Number: 12008

1. PRODUCT AND COMPANY IDENTIFICATION Revision Date :

Product Name : DURALIFE® TRANSFORMER OIL- ALL GRADES

2 HAZARDS IDENTIFICATION :

IMMEDIATE HEALTH EFFECTS

EYE : Not expected to cause prolonged or significant eye irritation .

SKIN : Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin.

INGESTION : Not expected to be harmful if swallowed .

INHALATION : This product is not expected to pose an inhalation hazard under conditions of normal use . This product has a low vapor pressure and is not expected to present an inhalation hazard at ambient conditions. Caution should be taken to prevent aerosolization or misting of this product. Acute and chronic overexposures generated under unusual conditions may be irritating to the respiratory tract .

4 FIRST AID INFORMATION

EYE CONTACT : Immediately flush eyes with large amounts of water and continue flushing until irritation subsides. If material is hot, treat for thermal burns and seek immediate medical attention.

SKIN CONTACT : No treatment is necessary under ordinary circumstances. Remove contaminated clothing. Wash contaminated area thoroughly with soap and water. If material is hot, submerge injured area in cold water. If victim is severely burned, remove to a hospital immediately.

INHALATION : This material has a low vapor pressure and is not expected to present an inhalation exposure at ambient conditions. If vapor or mist is generated when the material is heated, and the victim experiences signs of respiratory tract irritation, remove to fresh air .

INGESTION : No treatment is necessary under ordinary circumstances. Do not induce vomiting. This material does not present any known ingestion hazard.

5 FIRE AND EXPLOSION INFORMATION

Extinguish Procedure :

Flash Point: > 202 °F (145 °C) Test Method: ASTM D 92 (C.O.C.)

M/s. Rungta Mines Limited (Ferro Alloys Division), Tulasidiha, Dhenkanal

Flammable Limits in Air

Upper Percent : NA

Lower Percent : NA

Auto-Ignition Temperature: > 270 °C

Test Method: NA

NFPA Classification: Health: 0 Flammability: 1 Reactivity: 0

Extinguishing Media : Use dry chemical, foam, or carbon dioxide.

Fire Fighting Measures

Special Fire Fighting Procedures and Equipment : Water may be ineffective but can be used to cool containers exposed to heat or flame to prevent vapor pressure buildup and possible container rupture. Caution should be exercised when using water or foam as frothing may occur, especially if sprayed into containers of hot, burning liquid.

Unusual Fire and Explosion Conditions : Dense smoke may be generated while burning. Carbon monoxide, carbon dioxide, and other oxides may be generated as products of combustion.

Hazardous Combustion By-Products : None

Spill or Leak Procedures

Protective Measures : Eliminate all sources of ignition in vicinity of spilled material.

Accidental Release Measures : Stop the source of the leak or release. Clean up releases as soon as possible, observing precautions in Exposure Controls/Personal Protection. Contain liquid to prevent further contamination of soil, surface water or ground-water. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate , remove contaminated soil.

Handling and Storage Information

Handling : Fire extinguishers should be kept readily available.

Storage : Do not transfer to unmarked containers. Store in closed containers away from heat, sparks, open flame, or oxidizing materials. See also additional information section below.

Empty Container Warnings

Caution : Empty drums should be completely drained, properly bunged and promptly returned to a reconditioned drum, or properly disposed. Empty containers retain product residue and can be dangerous.

Caution : Do not reuse this container. Empty container may retain product residues.

Flammable Limits in Air

Upper Percent : NA

Lower Percent : NA

Auto-Ignition Temperature: > 270 °C

Test Method: NA

NFPA Classification: Health: 0 Flammability: 1 Reactivity: 0

Extinguishing Media : Use dry chemical, foam, or carbon dioxide.

Fire Fighting Measures

Special Fire Fighting Procedures and Equipment : Water may be ineffective but can be used to cool containers exposed to heat or flame to prevent vapor pressure buildup and possible container rupture. Caution should be exercised when using water or foam as frothing may occur, especially if sprayed into containers of hot, burning liquid.

Unusual Fire and Explosion Conditions : Dense smoke may be generated while burning. Carbon monoxide, carbon dioxide, and other oxides may be generated as products of combustion.

Hazardous Combustion By-Products : None

Spill or Leak Procedures

Protective Measures : Eliminate all sources of ignition in vicinity of spilled material.

Accidental Release Measures : Stop the source of the leak or release. Clean up releases as soon as possible, observing precautions in Exposure Controls/Personal Protection. Contain liquid to prevent further contamination of soil, surface water or ground-water. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate , remove contaminated soil.

Handling and Storage Information

Handling : Fire extinguishers should be kept readily available.

Storage : Do not transfer to unmarked containers. Store in closed containers away from heat, sparks, open flame, or oxidizing materials. See also additional information section below.

Empty Container Warnings

Caution : Empty drums should be completely drained, properly bunged and promptly returned to a reconditioned drum, or properly disposed. Empty containers retain product residue and can be dangerous.

Caution : Do not reuse this container. Empty container may retain product residues.

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EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits and Guidelines: This product does not contain any components with OSHA or ACGIH exposure limits.

Personal Protective Equipment

EYE/FACE PROTECTION : No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as good safety practice.

SKIN PROTECTION : No skin protection is required for single, short duration exposures. For prolonged or repeated exposures, use impervious clothing (boots, gloves, aprons, etc.) over parts of the body subject to exposure. If handling hot material, use insulated protective clothing (boots, gloves, aprons, etc.). Launder soiled clothes. Properly dispose of contaminated leather articles including shoes, which cannot be decontaminated.

RESPIRATORY PROTECTION : Respiratory protection is not required under conditions of normal use. If vapor or mist is generated when the material is heated or handle, use an organic vapor respirator with a dust and mist filter. All respirators must be NIOSH certified. Do not use compressed oxygen in hydrocarbon atmospheres.

PERSONAL HYGIENE : Always wash hands and face with soap and water before eating, drinking, or smoking. Consumption of food and beverage should be avoided in work areas where this product is present.

ENGINEERING CONTROL/WORK PRACTICES : Use in a well-ventilated area. If user operations generate an oil mist, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended mineral oil mist exposure limits.

PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Bright Yellow Pour Point : < -40 oF (- 40 oC)

Odor : Petroleum – mild Solubility in Water : Negligible in water

Physical State : Liquid Vapor Pressure : < 0.1 mm Hg

Boiling Point : > 482 oF (250 oC) Vapor Density (air=1) : NA

Melting Point : -59.8 oF(-51 oC) pH : NA

Specific Gravity : < 1 Viscosity @ 40 oC : 12 c St m

STABILITY AND REACTIVITY INFORMATION

Chemical Stability : Stable

Condition to Avoid : High heat and open flames

Incompatible Materials to Avoid : May react with strong oxidizing agents

TOXICOLOGICAL INFORMATION

Primary Eye Irritation : NA

Primary Skin Irritation : NA

Acute Dermal Toxicity : NA

Subacute Dermal Toxicity : NA

Dermal Sensitization : NA

Inhalation Toxicity : NA

Skin Toxicity : NA

Mutagenicity : NA

ENVIRONMENTAL INFORMATION

Regulatory Information : All disposals must comply with federal, state, and local regulations. The material, if spilled or discarded, may be a regulated waste. Refer to state and local regulations. Department of Transportation (DOT) regulations may apply for transporting this material when spilled.

Waste Disposal Methods : Waste material may be landfilled or incinerated at an approved facility. Materials should be recycled if possible.

TRANSPORTATION INFORMATION

Ordinary Fuel Bulk : Not Regulated

Ordinary Fuel Non-Bulk : Not Regulated

The DOT description is provided to assist in the proper shipping classification of this product and may not be suitable for all shipping descriptions. Health and Environmental Label Language

CAUTION : Contains Petroleum Lubricant. Repeated skin contact can cause skin disorders.

ATTENTION : Used motor oil is a possible skin cancer hazard based on animal data. Repeated exposure to oil mist in excess of the OSHA limit (5mg/m3) can result in accumulation of oil droplets in pulmonary tissue.

PRECAUTIONARY MEASURES : Avoid excessive & prolonged skin contact. Wash thoroughly after handling. Avoid generation and inhalation of oil mists.

INSTRUCTIONS IN CASE OF FIRE OR SPILL : In case of fire, use water spray, foam, dry chemical or carbon dioxide. Water spray may be ineffective, but can be used to cool containers. In case of spill, do not use water, soak up with absorbent material.

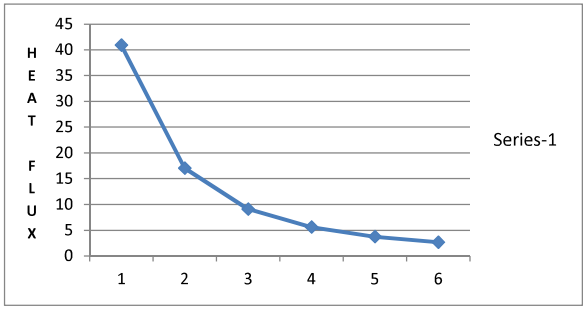
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FIRE MODELLING FOR HSD IN BARREL

Storage details			Input data for summer season
Storage type	200 L Barrel		
Capacity	400L		
Size	HSD Shed of size 25ft.x15 ft.x11 ft.		
Meteorological data	Source- Google net season		
Parameter	**Summer**	**Rainy**	**Winter**
Average wind speed m/sec	0.75	1.0	0.5
Average wind direction	NS	SN	N
Humidity	40	70	50 – 60
Average ambient air temperature (^{0}C)	40	35	20

HEAT FLUX DATA FOR SUMMER SEASON: Software use ALOHA

DISTANCE (M)	HEAT FLUX (KW/m^2)	Heat Propagation Curve
1	40.91	**HSD Storage Barrel-Summer season :**
2	17.01	
3	9.09	
4	5.57	
5	3.73	
6	2.65	



SIGNIFICANT "HEAT LEVEL" EXPERIENCED AT DISTANCE

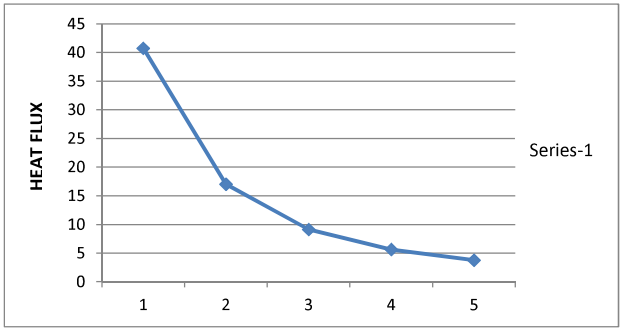
Significant Heat Level Value (KW/M^2)	Distance (M)	INDICATION
4.5	06	Causes pain if unable to cover the body within 20 sec. However blistering of the skin (2nd Degree burn) is likely cause with no lethality
12.5	2.5	Minimum Energy required for melting of plastic.
37.5	1.4	Sufficient to cause damaged to the equipment.

FIRE MODELLING FOR HSD IN BARREL

Storage details			Input data for Rainy season
Storage type	Barrel		
Capacity	400L		
Size	HSD Shed of size 25ft.x15 ft.x11 ft.		
Meteorological data	Source- Google net season		
Parameter	**Summer**	**Rainy**	**Winter**
Average wind speed m/sec	0.75	1.0	0.5
Average wind direction	NS	SN	N
Humidity (%)	40	70	50 – 60
Average ambient air temperature (^{0}C)	40	35	20

HEAT FLUX DATA FOR RAINY SEASON: Software use ALOHA

Distance (M)	Heat Flux (KW/m^2)	Heat Propagation Curve
1	40.75	**HSD Storage barrel – Rainy Season:**
2	17.03	
3	9.13	
4	5.62	
5	3.77	



SIGNIFICANT "HEAT LEVEL" EXPERIENCED AT DISTANCE

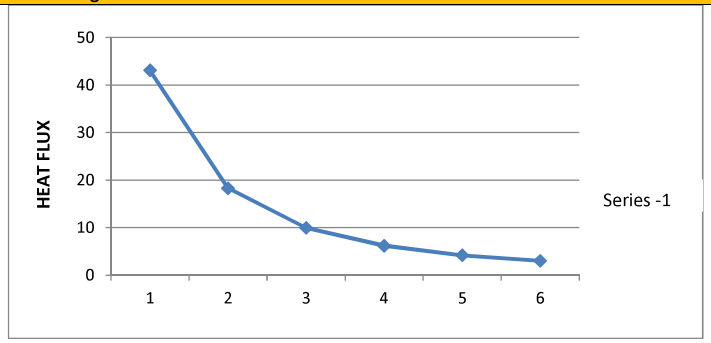
Significant Heat Level Value (KW/M^2)	Distance (M)	INDICATION
4.5	06	Causes pain if unable to cover the body within 20 sec. However blistering of the skin (2nd Degree burn) is likely cause with no lethality
12.5	2.5	Minimum Energy required for melting of plastic.
37.5	1.4	Sufficient to cause damaged to the equipment.

FIRE MODELLING FOR HSD IN BARREL

Storage details			Input data for Winter season
Storage type	Barrel		
Capacity	400L		
Size	HSD Shed of size 25ft.x15 ft.x11 ft.		
Meteorological data	Source- Google net season		
Parameter	**Summer**	**Rainy**	**Winter**
Average wind speed m/sec	0.75	1.0	0.5
Average wind direction	NS	SN	N
Humidity (%)	40	70	50 – 60
Average ambient air temperature (^{0}C)	40	35	20

HEAT FLUX DATA FOR WINTER SEASON: Software use ALOHA

DISTANCE (M)	HEAT FLUX (KW/m^2)	Heat Propagation Curve
1	43.1	**HSD Storage barrel – Winter Season.**
2	18.3	
3	9.94	
4	6.18	
5	4.18	
6	3.01	



SIGNIFICANT "HEAT LEVEL" EXPERIENCED AT DISTANCE

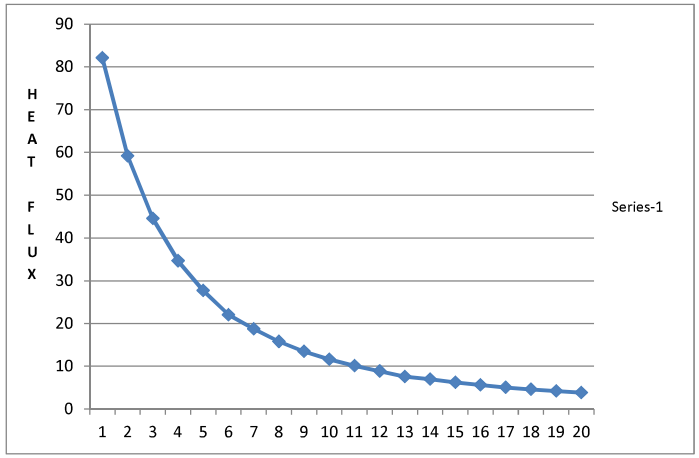
Significant Heat Level Value (KW/M^2)	Distance (M)	INDICATION
4.5	5	Causes pain if unable to cover the body within 20 sec. However blistering of the skin (2nd Degree burn) is likely cause with no lethality
12.5	2.3	Minimum Energy required for melting of plastic.
37.5	0.6	Sufficient to cause damaged to the equipment.

FIRE MODELLING FOR TRANSFORMER OIL

Storage details			Input data for Summer season
Storage type	Transformer		
Capacity	2000L		
Size			
Meteorological data	Source- Google net season		
Parameter	**Summer**	**Rainy**	**Winter**
Average wind speed m/sec	0.75	1.0	0.5
Average wind direction	NS	SN	N
Humidity (%)	40	70	50 – 60
Average ambient air temperature (^{0}C)	40	35	20

Software used ALOHA

Distance (M)	Heat Flux (Kw/m^2)	Heat propagation Curve
1	82.11	37.5 MVA Transformer : Summer season:
2	59.2	
3	44.57	
4	34.68	
5	27.7	
6	22.06	
7	18.76	
8	15.81	
9	13.48	
10	11.63	
11	10.12	
12	8.88	
13	7.58	
14	6.99	
15	6.26	
16	5.63	
17	5.09	
18	4.62	
19	4.22	
20	3.86	



SIGNIFICANT "HEAT LEVEL" EXPERIENCED AT DISTANCE

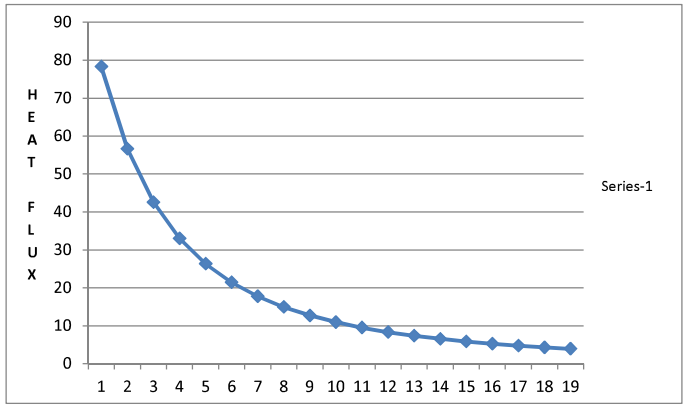
Significant Heat Level Value (KW/M^2)	Distance (M)	INDICATION
4.5	17.9	Causes pain if unable to cover the body within 20 sec. However blistering of the skin (2nd Degree burn) is likely cause with no lethality
12.5	9.8	Minimum Energy required for melting of plastic.
37.5	3	Sufficient to cause damaged to the equipment.

FIRE MODELLING FOR TRANSFORMER OIL

Storage details			Input data for Rainy season
Storage type	Transformer		
Capacity	2000L		
Size			
Meteorological data	Source- Google net season		
Parameter	**Summer**	**Rainy**	**Winter**
Average wind speed m/sec	0.75	1.0	0.5
Average wind direction	NS	SN	N
Humidity (%)	40	70	50 – 60
Average ambient air temperature (^{0}C)	40	35	20

Software used ALOHA

Distance (M)	Heat Flux (Kw/m^2)	Heat propagation Curve
1	78.3	37.5 MVA Transformer : Rainy season:
2	56.63	
3	42.53	
4	33.01	
5	26.31	
6	21.42	
7	17.75	
8	14.93	
9	12.71	
10	10.94	
11	9.51	
12	8.33	
13	7.36	
14	6.54	
15	5.84	
16	5.25	
17	4.74	
18	4.3	
19	3.92	



SIGNIFICANT "HEAT LEVEL" EXPERIENCED AT DISTANCE

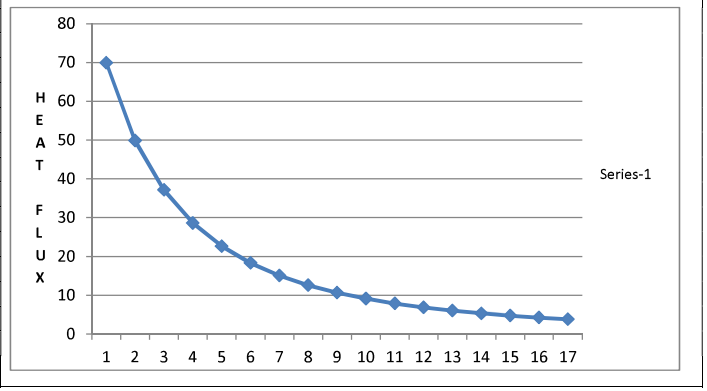
Significant Heat Level Value (KW/M^2)	Distance (M)	INDICATION
4.5	17.2	Causes pain if unable to cover the body within 20 sec. However blistering of the skin (2nd Degree burn) is likely cause with no lethality
12.5	9.5	Minimum Energy required for melting of plastic.
37.5	3.8	Sufficient to cause damaged to the equipment.

FIRE MODELLING FOR TRANSFORMER OIL

Storage details			Input data for Winter season
Storage type	Transformer		
Capacity	2000L		
Size			
Meteorological data	Source- Google net season		
Parameter	**Summer**	**Rainy**	**Winter**
Average wind speed m/sec	0.75	1.0	0.5
Average wind direction	NS	SN	N
Humidity (%)	40	70	50 – 60
Average ambient air temperature (^{0}C)	40	35	20

Software used ALOHA

Distance (M)	Heat Flux (Kw/m^2)	Heat propagation Curve
1	69.93	37.5 MVA Transformer : Winter season:
2	49.85	
3	37.15	
4	28.63	
5	22.66	
6	18.33	
7	15.1	
8	12.62	
9	10.69	
10	9.15	
11	7.91	
12	6.9	
13	6.06	
14	5.36	
15	4.77	
16	4.27	
17	3.84	



SIGNIFICANT "HEAT LEVEL" EXPERIENCED AT DISTANCE

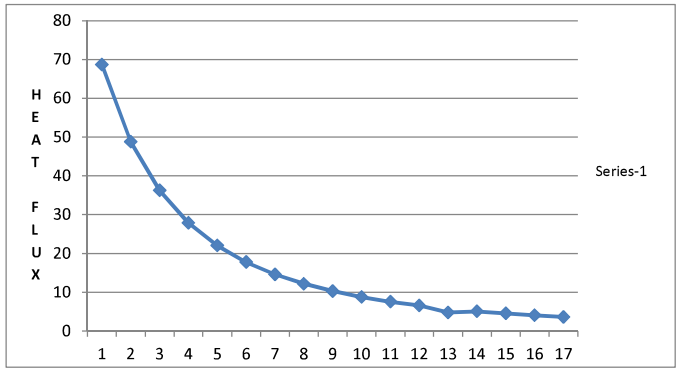
Significant Heat Level Value (KW/M^2)	Distance (M)	INDICATION
4.5	15.5	Causes pain if unable to cover the body within 20 sec. However blistering of the skin (2nd Degree burn) is likely cause with no lethality
12.5	8.3	Minimum Energy required for melting of plastic.
37.5	2.9	Sufficient to cause damaged to the equipment.

FIRE MODELLING FOR COAL IN COAL YARD :

Storage details		Input data for Summer season	
Storage type	Coal Yard		
Capacity	5000MT		
Size			
Meteorological data	Source- Google net season		
Parameter	**Summer**	**Rainy**	**Winter**
Average wind speed m/sec	0.75	1.0	0.5
Average wind direction	NS	SN	N
Humidity (%)	40	70	50 – 60
Average ambient air temperature (^{0}C)	40	35	20

HEAT FLUX DATA FOR SUMMER SEASON: Software used ALOHA

Distance (M)	Heat Flux (Kw/m^2)	Heat propagation Curve
1	68.64	Coal yard – Summer season
2	48.8	
3	36.27	
4	27.89	
5	22.03	
6	17.78	
7	14.61	
8	12.19	
9	10.31	
10	8.81	
11	7.6	
12	6.62	
13	4.8	
14	5.12	
15	4.55	
16	4.07	
17	3.65	



SIGNIFICANT "HEAT LEVEL" EXPERIENCED AT DISTANCE DUE TO FIRE ON COAL YARD IN SUMMER SEASON

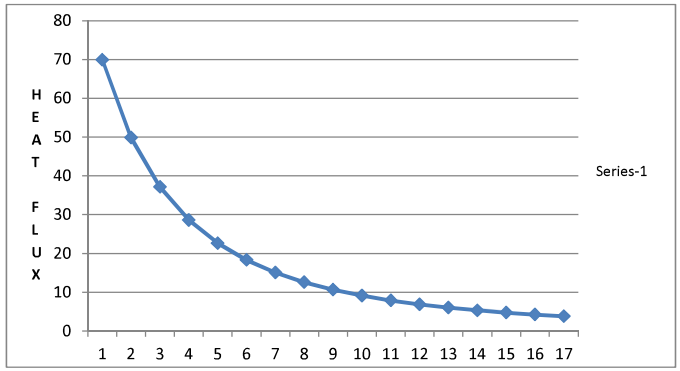
Significant Heat Level Value (KW/M^2)	Distance (M)	INDICATION
4.5	2.9	Causes pain if unable to cover the body within 20 sec. However blistering of the skin (2nd Degree burn) is likely cause with no lethality
12.5	6.9	Minimum Energy required for melting of plastic.
37.5	15	Sufficient to cause damaged to the equipment.

FIRE MODELLING FOR COAL IN COAL YARD :

Storage details		Input data for Rainy season	
Storage type	Coal Yard		
Capacity	5000MT		
Size			
Meteorological data	Source- Google net season		
Parameter	**Summer**	**Rainy**	**Winter**
Average wind speed m/sec	0.75	1.0	0.5
Average wind direction	NS	SN	N
Humidity (%)	40	70	50 – 60
Average ambient air temperature (^{0}C)	40	35	20

HEAT FLUX DATA FOR RAINY SEASON: Software used ALOHA

Distance (M)	Heat Flux (Kw/m^2)	Heat propagation Curve
1	69.93	Coal yard – Rainy season
2	49.85	
3	37.15	
4	28.63	
5	22.66	
6	18.33	
7	15.1	
8	12.62	
9	10.69	
10	9.15	
11	7.91	
12	6.9	
13	6.06	
14	5.36	
15	4.77	
16	4.27	
17	3.84	



SIGNIFICANT "HEAT LEVEL" EXPERIENCED AT DISTANCE DUE TO FIRE ON COAL YARD IN RAINY SEASON

Significant Heat Level Value (KW/M^2)	Distance (M)	INDICATION
4.5	15.2	Causes pain if unable to cover the body within 20 sec. However blistering of the skin (2nd Degree burn) is likely cause with no lethality
12.5	8.3	Minimum Energy required for melting of plastic.
37.5	3.0	Sufficient to cause damaged to the equipment.

FIRE MODELLING FOR COAL IN COAL YARD :

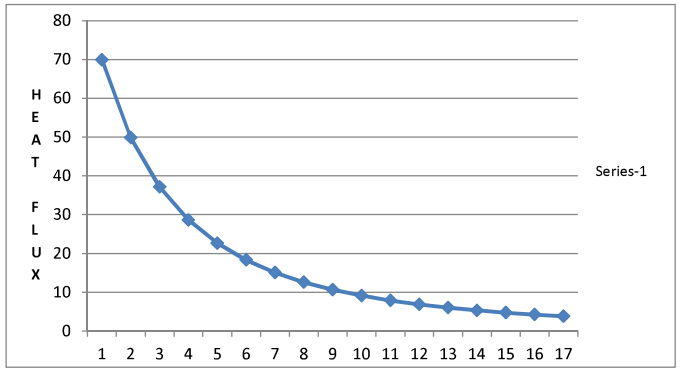
Storage details		Input data for Winter season	
Storage type	Coal Yard		
Capacity	5000MT		
Size			
Meteorological data	Source- Google net season		
Parameter	**Summer**	**Rainy**	**Winter**
Average wind speed m/sec	0.75	1.0	0.5
Average wind direction	NS	SN	N
Humidity (%)	40	70	50 – 60
Average ambient air temperature (^{0}C)	40	35	20

HEAT FLUX DATA FOR WINTER SEASON: Software used ALOHA

Distance (M)	Heat Flux (Kw/m^2)
1	69.93
2	49.85
3	37.15
4	28.63
5	22.66
6	18.33
7	15.1
8	12.62
9	10.69
10	9.15
11	7.91
12	6.9
13	6.06
14	5.36
15	4.77
16	4.27
17	3.84

Heat propagation Curve

Coal yard – Winter season



SIGNIFICANT "HEAT LEVEL" EXPERIENCED AT DISTANCE DUE TO FIRE ON COAL YARD IN WINTER SEASON

Significant Heat Level Value (KW/M^2)	Distance (M)	INDICATION
4.5	15.2	Causes pain if unable to cover the body within 20 sec. However blistering of the skin (2nd Degree burn) is likely cause with no lethality
12.5	8.3	Minimum Energy required for melting of plastic.
37.5	3.0	Sufficient to cause damaged to the equipment.