7.1 RISK ASSESSMENT & DISASTER MANAGEMENT:

7.1.1 General Information About The Plant:

M/s KIC Metaliks Ltd., steel project is located at Raturia Industrial area, Angadpur, Durgapur developed by Asansol Durgapur Development Authority, in Burdwan district of West Bengal. The project site is at latitude **23^0 30' 32'' N** and longitude **87^0 16' 39.89'' E, MSL 450m**. The project is well connected by road and rail networks. The important Grand Trunk road connecting Kolkata & Delhi is passing only at 3 Km from the site. The nearest railway station at Durgapur on main line Howrah- New Delhi is about 2 km.

M/s KIC Metaliks Ltd. was incorporated on 26th August 1986 and commissioned its pig iron unit in Raturia Industrial in February 1998 by setting up one Mini Blast Furnace of volume 215 m3 with production capacity of 109,000 TPA and slag cement grinding unit of capacity of 100 TPD utilizing the in plant waste MBF slag.

7.1.2 Project Configuration & Product Mix After Expansion

Existing Facilities	**E C taken F. No J 11011/556/2009-IA II (I) dt.24th May 2011**	**Proposed expansion**	**Configuration after expansion**	**Product & capacity after expansion**
215m^3 MBF	Revamping of MBF to increase capacity	-	215m^3 MBF	HM 2,10,000 TPA
100 TPD Cement Plant	300 TPD Cement plant	-	300 TPD Cement plant	Slag cement 1,00,000 TPA
-	1x25m2 sinter plant	-	1x25m2 sinter plant	Sinter 3,36,000 TPA
-	1x50T EAF with LF & VD	1x30T EAF in its place	1x30 T EAF with LF & VD	Liquid metal 1,92,000 TPA
-	2x9 MVA Ferro Alloy	-	2x9 MVA Ferro Alloy	Fe-Cr, Fe-Mn Si-Mn 30,000 TPA
-	24,000 TPA DI spun pipes (Not installed)	2x20 T IF 2x1.1 MTPAcentrifugal Casting machine	2x20 T IF 2x1.1 MTPAcentrifugal Casting machine	DI pipes 2,00,000 TPA

-	5 MW CPP from BF gas	-	5 MW power	5 MW power
-	-	2x350T DRI Kilns	2x350T DRI Kilns	DRI 2,24,000 TPA
-	-	4x15T IF, LF	4x15T IF, LF	Liquid metal 1,92,000 TPA
-	-	1200 TPD CCM	1200 TPD CCM	Billet
-	-	1200 TPD Rolling Mill	1200 TPD Rolling Mill	3,78,000 TPA rolled(TMT rods, angles)products
-	-	14 MW (WHRB) CCP	14 MW (WHRB) CCP	14 MW power
-	-	100 TPD Oxygen Plant	100 TPD Oxygen Plant	100 TPD Oxygen
-	-	50 TPD Nitrogen Plant	50 TPD Nitrogen Plant	

7.1.3 Man Power

On expansion all the existing infrastructure and man power of existing plant will be utilized for expansion project also. However there will be additional man power skilled in new installation will be required. Besides there will be increase in contract labor, security and canteen personnel. It is estimated that about 692 will be regular employment plus about 50 Security Staff.

7.1.4 Process And Related Inventory

DRI kilns

M/s K I C Metaliks Ltd. is proposing 2x350 TPD coal based DRI kilns for production of Sponge iron as scrap substitute for IFs and 1x30T EAF. Lumpy Hematite ores will undergo direct reduction by carbon of coal with the help of lime stone to produce spongy sponge iron, Char will come out as co-product which will be sold to nearby FBC project till company sets up its own FBC. Heat for reduction reaction will be supplied by additional coal consumption.

I F

The company proposes 4x15T Core less Induction Furnaces to produce liquid metal by melting DRI, pig iron and scrap by electricity eddy current of Induction Furnace. Slag will float over molten metal and will be scooped out. Molten metal will be refined in L F and will join with molten metal of 1x30 T EAF for production of TMT rods etc.

Iron about 15% comes out sticking to surface of slag. This slag will be cooled down; ground and Iron part will be separated from it magnetically to get slag equivalent to river sand and can be used for construction purposes. Recovered iron will be recycled back to IF for remelting.

EAF

The company has proposed 1x30T EAF. This will melt pig iron, DRI and hot metal from MBF which after removal of excess carbon, sulphur and Phosphorous on oxidation by Oxygen before casting to billets.

TMT

Coal based DRI kilns will produce sponge iron utilizing lumpy hematite iron ore, DRI grade coal and dolomite. Sponge iron will be melted in Induction Furnace along with Pig iron from MBF and heavy melting iron scraps purchased from market and in plant generation. A part of hot metal from IF will be utilized to manufacture DI pipes for sale.

In MBF iron sinter will be melt in combustion heat of coal and hot metal will be mostly used to manufacture DI pipes and balance to be cast to pig iron in PCM. Pig iron will be utilized in IF and EAF.

EAF will melt DRI, Pig iron and scrap to produce hot metal. Hot metal from IF will join with it and refined in LF. Phosphorus the enemy of steel and Sulphur will be removed on oxidation, carbon will be reduced and Ferro alloys may be added to impart quality and thus required grade steel melt will be prepared. This melt will be cast in CCM to produce hot billets. Finally hot billets will pass through series of rolling mills and iron rods and angles will be produced which on short period water quenching will be converted to TMT rods, highly suitable for construction purpose.

Adequate size Vacuum Degassing unit is to be provided for alloy addition and production of special grade steel.

Since the liquid steel is largely continuously cast in the present day practice, precise control of temperature is absolutely essential for smooth casting and better surface quality . This is achieved by the application of ladle metallurgy technology.

DI Pipes

Hot metal from MBF shall undergo Spheroidization in a special ladle at about 1500 °C by tundish treatment and 2.1 % of Fe=Si & Mg metal will be added to it. molten iron will then pass through Centrifugal Casting machine for production of Ductile Iron Spun pipes.

In the beginning of casting cycle a core is placed in the bell end of the mould. The mould moves to the pouring position encompassing a long narrow pouring trough, which is then sprayed to the wall of the mould. Then the pipe extractor is actuated to remove the pipe from the mould.

To remove the rust in the internal surface of a mold, it will be grounded with sand wheel before its dotted with peening head to increase its crack resistance. Annealing process consists of heating section, heat holding section, slow cooling section and fast cooling section. Ductile iron pipe will be entered to a long machine and rolled on it. Certainly its temperature will be controlled.

Adhesive molten zinc will be extracted to external surface of pipe. It is mandate that a minimum zinc content of 135 g/m2 and a minimum average finishing layer thickness of 70 µm to be adhered to.

Protective internal linings is applied to ductile iron pipes to inhibit corrosion, the standard internal lining is cement mortar.

The pipe then tested with hydraulic pressure of 30 to 60 kg/cm2 depending on nominal bore. The company proposes to manufacture DI pipes of NB 80 to 1100 mm and length of 5.5 to 6.0m

Oxygen Plant

There will be requirement of Oxygen in project mainly for MBF and EAF, of course refining, cutting of billets etc will also require Oxygen. There will be requirement of nitrogen for purging of equipments and for use in low heating burners to reduce NOx. Nitrogen will be required as grinding and conveying media of PCI unit. 1 X 50 TPD Oxygen plant in Phase I & 1 X 100 TPD Oxygen plant in Phase II has been proposed.

PCI Plant

In order to reduce costly coke consumption in MBF and that to when there is scarcity ok Coking coal in the country it is mandatory to use pulverized coal injection in MBF as fuel supplement. This will reduce coke consumption per ton of hot metal production in MBF.

80kg use of PCI reduces coke consumption by 72 kg/THM production. Therefore there will be closed circuit grinding of coal in PCI unit where conveying and grinding environment will be Nitrogen. Vertical rolling mill unit of 100TPD has been proposed.

CCM

2x600T Continuous Casting Machines have been proposed for KIC Metaliks Ltd. This unit will cast molten metal from LF and Vacuum Degasser units to billets. Hot billets will be cut to required length by Oxygen cutters and fed to series of rollers to manufacture rods and angles or channels.

R M

1200T Rolling mills have been proposed. After getting required size and length the rod while steel red hot will be passed through a water bath. This will suddenly quench surface while core is steel red hot. This heat will be slowly migrate to surface and relieve stress. Thus TMT rods will be manufactured which have extensive use in construction work for its greater workability.

Cement Plant

BF slag will be granulated and utilized to manufacture slag cement in 300 TPD cement

7.1.5 INVENTORY OF RAW MATERIALS

The inventories of raw materials used in the process are listed in the table below, which gives details of material stored. It contains maximum one time storage for each substance in process and also that in stores.

Table 7.1 Maximum one time storage of raw materials

Sl. No.	List of Raw Materials	Required Quantity in TPA	Source	Mode of Transport
1	Hematite Iron Ore Lumps	3,85,000	Odisha/ Jharkhand	Rail/ Road
2	Iron ore Fines	4,00,000	Odisha/Jharkhand	Rail/Road
3	Non-Coking Coal for DRI	1,77,000	Raniganja/South Africa	Rail/Road/Ship
4	Boiler grade Coal for AFBC	72,000	Raniganja	Rail/Road
5	Coal for PCI	23,500	Australia	Ship/Road
6	Lime stone/Dolomite	8,960	Sundergarh (Odisha)	Rail/ Road
7	Scrap	1,30,000	Local Purchase	Road

7.1.6 Inventory Of Hazardous Substances:

There are only two sources of generation of HW, maximum of which is either recycled or reused at present. The inventory of Hazardous materials is mentioned below:

(a) Industrial waste generation and reuse in Sinter Plant are as follows:-

Sl. NO.	CATEGORYS	ITEMS	GENERATION	UOM	DURATION (MONTHS)	REUSE STATUS	REQUIREMENT OF USED LUB
1	GREASE	HT-XX	300	Kg	6	* Total 300 nos of rollers of haulege chain(rotating part) lubrication which dipped in water. * Sinter machine, Cooler,PMD,SMD etc friction wheel. * Per day usage 2.5 kg(Approx).	450
		EP-2	30	Kg	6		
		BALMAROL	12	Kg	6		
		LGMT 2/5	2	Kg	6		

2	**OIL**	SERVO-150	210	LTR	6	* Total 23 nos of belt conveyor. * All idiler of the 23 nos of belt conveyor for lubrication. * Per day 4 L (Approx).	720
		SERVO-320	150	LTR	6		
		SERVO-460	30	LTR	6		
		SERVO SYSTEM 46	210	LTR	6		
		TRANSFORMER OIL	NA	NA	6	* Regular filteration of transformer oils like 2MVA,1.25MVA,ESP transformer etc.	NA
3	**FILTERS**		18	Nos	6	* Used to igniting preheated furnace.	
4	**WASTE JUTE**		20	Kg	6	* Used in oil heating. * Igniting both the furnace.	

(b) Industrial waste generation and reuse in MBF Plant are as follows:-

Sl. NO.	CATEGORYS	ITEMS	GENERATION	UOM	DURATION (MONTHS)	REUSE STATUS	REQUIREMENT OF USED LUB
1	**GREASE**	EP-2	10	Kg	6	*Used in PCM link pin.	20
2	**OIL**	SYSTEM-68	120	LTR	6	* Total 8 nos of belt conveyor. * All idiler of the 8 nos of belt conveyor for lubrication. * Per day 2 L (Approx). *Used in drill machine & mud gun machine for lubrication.	450
		SERVO PRIME-68	60	LTR	6		
		ASW-68	60	LTR	6		
		SERVO-320	120	LTR	6		
		SERVO SYSTEM 46	60	LTR	6		
3	**FILTERS**		18	Nos	6	* Charged into the hot metal laddle to recover	

						metal.	
4	**WASTE JUTE**		20	Kg	6	*Used in runner heating & laadle heating. *Used in heating in PCM runner.	

7.1.7 Risk Reduction Opportunities

The following opportunities will be considered as a potential means of reducing identified risks during the detailed design phase:

- Buildings and plant structures designed for cyclone and seismic events (where appropriate), to prevent structural collapse and integrity of weather (water) proofing for storage of dangerous goods;
- Provision for adequate water capacity to supply fire protection systems and critical process water;
- Isolate people from load carrying/mechanical handling systems, vehicle traffic and storage and stacking locations;
- Installation of fit-for-purpose access ways and fall protection systems to facilitate safe access to fixed and mobile plant;
- Provision and integrity of process tanks, waste holding tanks and bunded areas as per relevant standards;
- Containment of hazardous materials;
- Security of facility to prevent unauthorized access to plant, introduction of prohibited items, and control of onsite traffic; and
- Development of emergency response management systems commensurate with site specific hazards and risks (fire, explosion, rescue and first aid).

ToR-7(xiii) Onsite and Offsite disaster (natural and man made) preparedness and emergency management plan including risk assessment and damage control. Disaster management plan to be linked with district Disaster management Plan.

7.2 DISASTER IDENTIFICATION:

7.2.1 Introduction:

Disaster may be defined as a sudden occurrence of incidence in such a magnitude as to affect the normal pattern of life inside or in the vicinity of plant which have the potential of causing extensive injury of loss of life or damage to property and tend to cause disruption inside/outside the site.

Hazardous substances are being handled, generated and stored in increasing quantities a various manufacturing facilities in recent years. This has posed a serious risk for the plant, persons and the environment encompassing thereof. The disasters following incidents in some industrial units handling hazardous substances in the last 2 to 3decades has made it imperative for all concerned to device measures and implement them immediately and effectively to mitigate their adverse effects, if not, to totally eliminate them. The need to protect human being, the flora and fauna as well as our bio-diversity against these potential dangers has prompted the government for promulgation of various statutory provisions for preparation of hazard mitigation plans based on their risk impacts.

The Factories (Amendment) Act 1987 and manufacture storage and Import of

Hazardous Chemical Rules- 1989 has provided regulation making mandatory for all owners of hazardous undertakings to prepare for their Onsite Emergency Plan in a pragmatic way and keep those well re-harassed for rapid action in actual crisis situation.

The goal of DMP is the effective containment of the emergency situation by proper mitigative action at the place of occurrence, cautioning people in adjoining affected localities; prompt rescue and provisions of medical aid to affected persons and communication to civil authorities for rushing in help from outside.

This objective is to be achieved by defining the functions and responsibilities of all concerned managerial, operational and supporting services department personnel with respect to detection and effective implementation of emergency action plan.

7.2.2 Objectives of Disaster Management Plan (DMP):

The objectives of DMP is to describe and spell out industry's emergency response actions that requires to be initiated to deal with various emergencies that could occur at the facility, with the response organization structure deployed in the shortest possible time. Thus the objective of emergency response plan can be summarized as:

- Rapid control and containment of the hazardous situation.
- Minimization of the risk and impact of event / accident.
- Effective rehabilitation of the affected persons and prevention of damage to property.

7.2.3 Elements of DMP:

In order to effectively achieve the above mentioned objective of, the critical elements of the DMP are:

- Reliable and early detection of an emergency and careful planning.

- The command, co-ordination, and response organization structure along with clearly demarcated line and staff function.
- The availability of resources for handling emergencies.
- Appropriate emergency response actions forecasted with least margin of error.
- Effective notification and communication facilities.
- Proper training of the concerned personnel.
- Regular review and updating of the DMP.

The DMP should open up with a forward duly signed by the plant-in-charge.

7.2.4 Responsibility of Implementation of DMP:

Responsibility for establishing and maintaining an Emergency Preparedness

Plan/DMP belongs to the Plant-in-charge. He is responsible for the control of the plan, and for ensuring that the plan is applicable and implementing procedures are operated during emergency situation and are reviewed and revised annually.

As a member of top management he is responsible for the training of personnel to ensure that adequate emergency response capabilities are maintained in accordance with the plan. He is also responsible for ensuring the regular conduct of drills and other measures, as outlined in the DMP.