INTRODUCTION

Kalyani Steels Ltd (KSL) is a part of over $3.0 billion Kalyani Group. KSL was established in 1973 and is a leading manufacturer of forging and engineering quality carbon & alloy steels using the blast furnace route.

KSL had planned expansion of their Integrated Steel Plant (ISP) for production of 1.4 MTPA carbon and alloy steel along with stainless steel in Koppal district of Karnataka. The Environmental Clearance (EC) for the proposed expansion was accorded by Ministry of Environment, Forest & Climate Change (MoEFCC) vide F. No. J-11011/172/2007-IA II(I) on 19th January 2016. The timeline for obtaining EC was as follows:

i) ToR prescribed during 23rd meeting of Reconstituted Expert Appraisal Committee (EAC) held on 18th-19th September, 2014.

ii) Public Hearing conducted on 28th march 2015.

iii) Final EIA/EMP report submitted vide application dated 26th June, 2015.

iv) EC granted vide F. No. J-11011/172/2007-IA II(I) on 19th January 2016

As per the EC, KSL had proposed to install by-product Recovery type coke ovens with the following configuration:

i) 2 X 45 ovens, 4.3 m tall
ii) Stamp charging
iii) 0.6 MTPA gross coke capacity
iv) CDQ

However, at present KSL proposes to install 0.6 MTPA heat recovery type coke ovens with stamp charging in two phases;

1) 0.20 MTPA Heat Recovery coke oven with wet quenching in Phase1

2) 0.40 MTPA Heat Recovery coke oven in Phase 2.

Coke dry quenching would be installed in Phase-2 which would handle 0.6 MTPA of gross coke. A stand-by wet quenching station will also be installed in Phase 2 to be used during annual maintenance of CDQ.

It was proposed to install DRI based on Coke oven gas (COG) as reductant, which was to be generated from by-product recovery type coke ovens. Since there would be no generation of combustible off gas(as reductant) from heat recovery type coke ovens, the initial proposal for installation of COG based DR would not be viable. Hence, setting up of DRI would no longer be considered. It is proposed that the requisite amount of DRI/Scrap would be procured from external sources.

With respect to the present proposition, there would be requirement for amendment in the existing EC. The final configuration of the plant as per the proposed modification in the configuration of the Coke oven plant along with the existing configuration (as per EC) is tabulated below:

TABLE 1 - PRODUCTION PLAN W.R.T. PROPOSED AMENDMENT IN COKE OVEN CONFIGURATION

Sl. No.	Production Unit	Configuration as per EC dated 19th January 2016	Proposed Configuration for amendment of EC	Final configuration
1	Coke Oven Plant	2 x 45 ovens 0.6 MTPA Gross Coke Byproduct Recovery type Coke ovens, CDQ	3 x (max 4 x 11 ovens) 0.6 MTPA Gross Coke Heat Recovery type Coke ovens, Wet quenching in Phase 1 & CDQ in Phase 2 for 0.6 MTPA gross coke	3 x (max 4 x 11 ovens) 0.6 MTPA Gross Coke Heat Recovery type Coke ovens, Wet quenching in Phase 1 & CDQ in Phase 2 for 0.6 MTPA gross coke
2	Sinter Plant Pellet Plant	1 x 33 sq m + 1 x 130 sq m 1.79 MTPA Product Sinter 1 x 1.2 MTPA	No change	1 x 33 sq m + 1 x 130 sq m 1.79 MTPA Product Sinter 1 x 1.2 MTPA
3	Blast Furnace DR Plant	1 x 750 cu m + 2 x 250 cu m + 1 x 350 cu m 1.64 MTPA Hot Metal 1 x 0.5 MTPA	No change Deletion of DR Plant	1 x 750 cu m + 2 x 250 cu m + 1 x 350 cu m 1.64 MTPA Hot Metal None

Sl. No.	Production Unit	Configuration as per EC dated 19th January 2016	Proposed Configuration for amendment of EC	Final configuration
4	Pig casting machine	40 TPH 180 TPH	No change	40 TPH 180 TPH
5	Lime/dolo Calcining Plant	2 x 300 TPD 0.12 MTPA Lime	No change	2 x 300 TPD 0.12 MTPA Lime
6	Steel Melt Shop	BOF - 2 x 60 T	No change	BOF - 2 x 60 T
	1.46 MTPA	LF - 3 x 60 T		LF - 3 x 60 T
	Liquid Steel	IF - 1 x 20 T		IF - 1 x 20 T
		VD/RH - 2 x 60		VD/RH - 2 x 60
		EAF - 1 x 60 T		EAF - 1 x 60 T
		AOD - 1 x 60 T		AOD - 1 x 60 T
7	Casting units	Continuous Caster-Billet cum bloom cu m round caster - 1 x 3 strand Billet cum bloom caster - 1 x 3 strand Bloom cum round caster - 1 x 2 strand Ingot Casting 1.4 MTPA Crude Steel	No change	Continuous Caster-Billet cum bloom cu m round caster - 1 x 3 strand Billet cum bloom caster - 1 x 3 strand Bloom cum round caster - 1 x 2 strand Ingot Casting 1.4 MTPA Crude Steel
8	Rolling Mill	Bar & Wire Rod Mill 0.49 MTPA Bars, flats & Wire Rods	No change	Bar & Wire Rod Mill 0.49 MTPA Bars, flats & Wire Rods
		Heavy bar Mill 0.31 MTPA Rounds & RCS		Heavy bar Mill 0.31 MTPA Rounds & RCS
		Bar & Rod Mill 0.34 MTPA Bars & Rods		Bar & Rod Mill 0.34 MTPA Bars & Rods
		Annealing Furnace -60 TPH Tempering Furnace – 50 TPH		Annealing Furnace -60 TPH Tempering Furnace – 50 TPH
9	Air Separation Plant	600 TPD (BOO basis)	No change	600 TPD (BOO basis)
10	Power Plant	BF gas based – 8 MW CDQ – 5.4 MW TRT – 3.65 MW	Additional 25 MW Waste Heat Recovery based Power Plant in Phase 1 and additional 50 MW Waste Heat Recovery based Power Plant in Phase 2 of Coke Oven. (total 75 MW including CDQ based power)	BF gas based – 8 MW TRT – 3.65 MW 25 MW Waste Heat Recovery based Power Plant in Phase 1 and additional 50 MW Waste Heat Recovery based Power Plant in Phase 2 of Coke Oven. (total 75 MW based on Coke Oven Waste Heat Recovery including CDQ based power)

Location of the Project

The proposed installation of heat recovery type coke oven would be done within the land premises of the ISP. Total land requirement for the expansion of ISP is 548.90 acres. No additional land would be required for the proposed change in configuration of coke oven and the proposed heat recovery type ovens would be accommodated within the existing acquired land of KSL. Hence, the proposed project does not entail aspects of Rehabilitation & Resettlement (R&R).

The site is located in Koppal district of Karnataka. The site lies between latitudes 15°19'25" - 15°20'41" N and longitudes 76°14'48" - 76°15'43" E and 498 m above mean sea level (MSL). It is located about 17-20 km north west of Hospet city in Karnataka.

Transport Linkages

NH 67 and SH 23 are adjacent to the Plant in North direction. The railway line is 0.5 km from the Plant in the northern direction and the nearest railway station is Ginigera. The site is about 11 km from Koppal. The nearest airport is Jindal Vijaynagar Airport which is about 65 km from the plant site. Few ports namely Mormugao Port, Krishnapatnam Port and Mangalore Port are located at distance varying from 400 to 700 km from the plant site.

Availability of Water

Total water requirement for the existing as well as the expansion of ISP was estimated to be about 4.68 MGD (considering byproduct recovery type coke oven), proposed to be drawn from Tungabhadra, at a distance of 5.2 km in south western direction of the plant site.

For the proposed change in configuration of coke ovens, the consumption of water is estimated to be around 50 cum/hr in place of 130 cum/hr as required by byproduct recovery type coke oven of same production capacity of 0.6 MTPA gross coke. Also, installation of DRI is not envisaged presently. Considering the above, the total requirement of water for the existing plant as well as the expansion would be about 4.30 MGD. Consent for withdrawal of 4.8 MGD from Tungabhadra Dam is available with KSL.

Availability of Electric Power

Total power requirement for the expansion of ISP was about 128 MW (considering byproduct recovery type coke oven), proposed be met through in-plant generation and drawal of power from KPTCL grid.

For the proposed change in configuration of coke ovens, the consumption of power is estimated to be 1.6 MW in place of 5.5 MW as required by byproduct recovery type coke oven of same production capacity of 0.6 MTPA gross coke. Also, installation of DRI is not envisaged presently. Considering the above, the total requirement of power for the ISP would be 120 MW, which would be met through in plant generation as mentioned above and the balance through KPTCL grid.

Social Infrastructure

Around 7.08% of the total population (of the study area as per the Census of 2011) comprises of tribal groups namely *Kurubaru,Lamanis and Banjaras*. Kannad, Urdu and Hindi are prevalent languages in areas related to service and labour. Major sources of livelihood in the study area are in the field of agriculture, factory work and small scale trade & business establishments.

Design Basis for Heat Recovery type Coke Ovens

Stamp charge heat recovery type coke making process with waste heat recovery boiler has been considered for the project. In this process the organic matter of the coal are combusted completely within the oven. The heat of combustion is used in keeping the walls of the ovens hot for the process of carbonization. No additional fuel is required for heating the walls of the ovens. Carbonization in heat recovery type coke ovens is slow and the coke produced is hard & lumpy and suitable for use as metallurgical coke in blast furnaces. The hot flue gas from carbonization is used to generate power or high pressure steam in Waste Heat Recovery Boilers (WHRB). There is no provision for recovering gas. These ovens operate under negative pressure and there is no fugitive emission during operation. Heat recovery type coke ovens are simple in operation and suitable for smaller coke production capacities in ISP or separately for independent Merchant Coke Ovens.

In the present proposal, the basic tentative design parameters are as presented in Table 2.

TABLE 2 - TYPICAL BASIC DESIGN PARAMETERS OF COKE OVEN

Item	Unit	Phase 1	Phase 2	Total
No. of ovens	Nos.	11	11	11
Coke oven block (Max)	Nos.	4	8	12
Total number of ovens	Nos.	44	88	132
Tentative Coal Cake size:				
Length	mm	12,200	12,200	12,200
Width	mm	3,600	3,600	3,600
Height	mm	1,100	1,100	1,100
Coal charged per oven	Dry T	48	48	48
Bulk density (stamped coal)	Dry T/m^3	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1
Normal carbonisation time	Hrs	65 - 67	65 - 67	65 - 67
Yield (Dry coal to Dry Coke)	%	74.1%	74.1%	74.1%
Days Operational	Days	365	365	365
Hrs/ Day Operational	Hrs/Day	24	24	24
Coke Production	Dry TPA	200,000	400,000	600,000

Coke Quality

The quality of coke desired is given in Table 3.

TABLE 3 - COKE QUALITY

Moisture, %	..	5.00% 0.5% with CDQ
Ash (dry basis), %	..	11.5 - 12.5%
Volatile matter (dry basis), %	..	1 - 1.5%
Sulphur, % (Max)	..	0.60%
M40 % (Min)	..	80.00%
M10 % (Max)	..	8.00%
CSR, %	..	62 - 64%
CRI, %	..	23-26%
BF Grade (including Nut Coke)	..	6 - 80 mm
Foundry Grade	..	> 80 mm
Coke Fines	..	< 6 mm

Coal Requirement and Blend

Coking coal requirement is based on the gross coke yield of 74.1 per cent over coal blend on dry basis. The coal requirement (Net & dry) based on the annual gross coke production of 600,000 tons along with coal blend percentage is given in Table 4.

TABLE 4 - COAL REQUIREMENT AND BLEND

Charge Mix

Coking Coal	Dry basis	
	% Dry Coal	Dry Coal/T Dry Coke
HCC Peak Downs	30%	0.406
HCC 64 Mid Vol	29%	0.388
Semi Soft	34%	0.460
Low Vol PCI	7%	0.094
Total Charge	**100%**	**1.350**
Yield		74.1%

Phase 1	Phase 2	Total
Annual Dry Coal TPA	Annual Dry Coal TPA	Annual Dry Coal TPA
81,263	162,527	243,790
77,687	155,373	233,060
92,099	184,197	276,296
18,857	37,713	56,570
269,906	**539,811**	**809,717**

Typical proximate analysis of the coal blend is given in Table 5.

TABLE 5 - PROXIMATE ANALYSIS OF COAL BLEND

Moisture, %	9 to 10
Ash (dry basis), %	9 to 9.5
Volatile matter (dry basis), %	23 to 25
Total sulphur, %	0.5 to 0.6
Size and bulk density of coal charge:	
- Fraction below 3.15 mm, %	90
- Bulk density of coal cake, ton/cu m (dry)	0.9 – 1.1

Production from Coke Plant

The production of coke from the plant would be as shown in Table 6.

TABLE 6 - PRODUCTION FROM COKE PLANT

Item	Unit	Phase 1	Phase 2	Total
BF Grade (6 to 80 mm) (including Nut Coke)	Dry TPA	166,000.00	332,000.00	498,000.00
Foundry Grade (> 80 mm)	Dry TPA	20,000.00	40,000.00	60,000.00
Coke Fines (< 6 mm)	Dry TPA	14,000.00	28,000.00	42,000.00
Total	**Dry TPA**	**200,000.00**	**400,000.00**	**600,000.00**
Flue Gas Generation (900 - 1000 C)	Mil M^3	130,000.00	260,000.00	390,000.00

Proposed Facilities

The coke oven plant would consist of the following major facilities:

i) Coal blending, crushing and conveying of coal to the coal tower.

ii) Stamp charged, heat recovery type coke oven with waste heat recovery boilers.

iii) Coke cutting and screening facilities including distribution up to junction house within the coke plant.

***Coal preparation and handling system*:** Coal would be received in Railway wagons from port and unloaded at the existing railway siding and brought to the coal yard by covered dumpers and stored in different stockpiles in the coal yard. Coal from the yard shall be transferred to blending silos. A shuttle conveyor at the top of the silos has been envisaged for filling up the silos with different grades of coal.

Measured quantity of coal shall be drawn from the bottom of each of the silos as per set blending ratio and to be conveyed to primary and secondary crushing stations (hammer mills). Water addition facility would be provided to maintain 10% moisture in the crushed coal, desired for making coal cake.

Coke ovens: Horizontal heat-recovery (HR) type coke making process has been considered for the project. Four blocks of 11 ovens each, with stamp charging, arranged in single row, would be installed to meet the requirement of gross coke of 200,000 tpy in Phase-1. Identical two such rows with four blocks of 11 ovens in each row would be installed to achieve a total production of 600,000 tpy of gross coke.

The stationary stamping station would be suitably located between the two blocks of ovens on each side. Blended and crushed coal from the coal preparation unit would be transferred to the coal tower of the stamping station. The stationary stamping would be hydraulic type and stamping of coal would be carried out, layer wise, on charging plate at the bottom of the coal box. After stamping, the coal cake would be charged to ready oven from pusher side with the help of charging plate. After charging, the charging plate would be withdrawn from the oven. The carbonization process would start taking heat from the oven. The hot gas evolved during carbonisation would be combusted partially in the chamber with controlled primary air. The products of the partial combustion from the oven chamber would be taken to the sole flues through down comers built into the oven walls. The partially combusted gas in the sole flues would be burnt completely with the help of controlled admission of secondary air. The hydrocarbons in the flue gases would be destructed by admitting excess air in sole flues. Thus, the carbonisation of coal cake takes place from both directions; in the form of radiation from top and through conduction from the oven sole. Each oven would be provided with automatic control through pressure controller.

One flue gas tunnel would be provided for two blocks of ovens. The flue gas tunnel would be connected to the stack through heat recovery boiler. One stack would be provided for two blocks. Suitable provisions in the flue gas tunnel would be made for isolation of the heat recovery boiler of the power generation unit. The ovens would be operated on natural draft when the heat recovery boiler is out of operation. Suitable control facilities would be provided for efficient control of coke oven stack draft.

After completion of carbonisation, oven doors on both sides would be opened and the pusher cum charging-machine would push the incandescent coke out of the oven. While coke side door would be closed after pushing, pusher side door would be closed after charging of coal cake. Red hot coke would be discharged into the quenching car and would be taken to the quenching station. For operation of doors, both at the pusher as well as at the coke sides, door extractors would be provided on the oven machines. One set of charging-cum-pusher car and quenching car would be provided for operation. The red hot coke would be quenched in the quenching station by conventional water spray in first phase which will eventually taken over by CDQ after completion of both the phases . After quenching, the coke would be discharged into the coke wharf. The quenching station would be complete with water tanks, pumps and settling basin for re-circulation of quench water. The supply of quenching water to the quenching spray would be done from the overhead quenching water tanks. Two quenching tanks have been considered. Make-up water would be supplied to the settling basin to replenish losses. The quenching tower would be of advance type design and provided with baffles, cleaning facility and grit arrestor arrangement to fulfill the prevailing emission norms for coke quenching in India.

The process flow sheet for production of 0.6 MTPA gross coke in heat recovery type coke ovens is presented in figure 1. The layout showing the disposition of the coke ovens along with associated facilities are shown in the layout.

The major units of the coke oven are given in Table 7.

TABLE 7 - MAJOR UNITS OF COKE OVENS

Item	**Phase 1**	**Phase 2**	**Total**
Coke oven block (Max)	4	8	12
Total number of ovens	44	88	132
Coal tower	1	1	2
Oven machines:			
- Charging-cum-pusher machine	1	1	2
- Coke quenching car	1	1	2
- Stamping station	1	1	2
Quenching tower with accessories	1 Wet Quenching station for Phase I (till Phase II is commissioned)	1 Dry Quenching common for Phase I & Phase II ovens + 1 Wet Quenching station for Phase 2 (Stand-by)	1 Dry Quenching common for Phase I & Phase II ovens + 2 Wet Quenching station (Stand-by)
Stack	2	4	6

Coke Dry Quenching: It has been envisaged that there would be installation of a common single chamber coke dry quenching unit in Phase 2 of the project.

CDQ is considered to be installed in Phase 2, as the coke production capacity in Phase 1 is too low to be economically viable for CDQ installation. This is due to low recovery of sensible heat from such low quantity of hot coke (about 22 tons per hour) in Phase 1. The minimum available capacity of CDQ with commercially proven design is about 50 tph. Installation of CDQ unit with coke oven plant having capacity less than 0.4 MTPA is therefore not feasible in view of unfavourable techno-economics arising out of very low generation of high pressure steam.

In Phase 2 of the project additional 0.4 MTPA capacity coke oven will be installed. The total coke making capacity of the plant will be about 0.6 MTPA after Phase 2 implementation. There will be about 68 tph of hot coke available to be cooled considering production from all the ovens. In order to cool the entire hot coke produced from coke ovens of Phase 1 and Phase 2, a CDQ unit capable of cooling about 75 tph of hot coke is envisaged for installation during Phase 2 of the project.

Charging-cum-pusher machine would push the incandescent coke, after completion of carbonisation, out of the oven. Red hot would be taken to coke dry quenching (CDQ) station in coke buckets. Standby wet quenching stations with coke wharf would be in operation at the time of scheduled maintenance in CDQ chamber/boiler/facilities and for emergencies.

In the CDQ unit, the hot coke is charged from the coke bucket into the cooling chamber with the help of overhead crane. Hot coke would be cooled with circulating inert gas in the cooling chamber. The hot coke would flow continuously from top to the bottom of the chamber and the inert gas would flow in opposite direction. The heat of the hot coke would be recovered by direct contact of circulating inert gas and the absorbed heat would be subsequently utilised for generation of steam in the waste heat boiler. Gravity settling type dust collector would be provided for separation of coarse particles from circulating gas prior feeding into boilers. From the waste heat boiler, the cooled circulating gas would then be admitted into cyclones, where fine fraction of coke dust would be removed. One boiler would be dedicated for CDQ unit.

Handling capacity of CDQ chamber	..	75 tph
Temperature of coke into CDQ chamber, °C	..	950-1,050
Temperature of circulating gas out of CDQ chamber, °C	..	880-920
Annual working days	..	340
Steam generation, tph	..	34
Steam pressure, MPa	..	11.5
Steam temperature, °C	..	535

Coke handling facilities: Coke after cooling at coke wharf is conveyed to the screening house. Coke would be screened first in an 80 mm screen. Over size coke is discharged to a double roll toothed crusher for coke cutting. The undersize (-80 mm) would be screened in 25 mm screen. The oversize coke is stored as hard coke in coke bunker.

Undersize fraction of 25 mm screen is carried to a 6 mm screen. Over size of this screen is stored as nut coke in separate bunker.

Finally, the undersize fraction of 6 mm screen is stored as coke breeze in a separate bunker.

In order to control the dust at screens, crushers and transfer points, dust extraction system would be installed in coke screening house.

***Flue Gas for Power Generation*:** The hot flue gas generating from the coke ovens at a temperature ranging from 900°C to 1,000°C would be utilised in waste heat recovery boilers for generation of high pressure steam. The flue gas after heat recovery would be exhausted to atmosphere through stack of suitable height by ID fan provided after the heat recovery boiler. The volume of flue gas would be about 130,000 N cu m/hr in Phase 1. It has been envisaged to install two heat recovery boilers in Phase 1 and four such boilers in Phase 2.

Flue gas de-sulphurisation: Wet desulphurisation using lime solution has been envisaged for desulphuring flue gas for the proposed project. In this process, lime solution is sprayed counter current to the flow of flue gas. The oxides of sulphur present in the flue gas, react with the lime to produce gypsum which settles down at the bottom of the desulphurisation tower.

Pollution Control Measures

Coke Making through Heat Recovery type Coke Ovens is generally recognized environment friendly as the ovens are all operated under negative pressure resulting in less fugitive emissions. In addition, the volatile matter from coal is completely combusted inside the oven by introduction of primary, secondary & tertiary air. The following pollution control measures would be adopted for adhering to the existing regulations and for cleaner operation:

i) Improved heating control system to ensure no leakage of un-burnt hydrocarbons into the atmosphere through stack.
ii) Maintaining improved draught inside oven for ensuring total combustion of gasses before it is let out into the atmosphere after waste heat recovery in the boilers.
iii) Adequate stack height to ensure proper dispersion.
iv) Arrangement of water sprinkling facility in the yard.
v) Installation of dust suppression system for coal handling unit and dust extraction system for coke screening unit.

vi) Installation of wet quenching system (in Phase 1) with grit arrestor and other accessories, to ensure minimum dust emission.

vii) Provision for coke dry quenching unit would be kept in Phase-2 for ensuring usage of sensible heat of hot coke for power generation.

viii) Desulphurisation of flue gas with lime spray.

The timeline for installation of coke oven plant is estimated to be about 24 months and the overall implementation schedule for the ISP of 60 months would be unaltered.

The capital cost for Recovery Type Coke Ovens considered earlier was approximately Rs. 850 crore. In the modified configuration, the capital cost for Non-Recovery type Coke Ovens considered is Rs. 750 crore.

A review of pollution load has been done with respect to by-product type and heat recovery type coke oven each for production of 0.6 MTPA gross coke and presented in the table 8.

TABLE 8 - BY-PRODUCT RECOVERY TYPE VS HEAT RECOVERY TYPE - COMPARATIVE ANALYSIS OF POLLUTI9ON

	By-product recovery type	**Heat recovery type**
Air		
Fugitive emission		
- Leakages from doors, lids, off takes	Yes Emission of dust and PAH (BaP) due to leakages	No leakage since the oven operates under negative pressure and the organic content is completely combusted inside
- Coal charging	Yes	No
- Coke pushing	Yes	No
Stack emission		
- Under-firing	Emission of PM, SO_2 & NOx	No
- Flue gas from carbonisation	The gas is collected after recovery & desulphurization of by-product and used as fuel and/or to produce power. The flue gases from end users would mainly contain CO_2 &	The desulphurized gas after recovery of heat is vented off to the atmosphere. The flue gas would mainly contain CO_2 & NOx.

	By-product recovery type	**Heat recovery type**
	NOx and would be vented off through stack at the respective consumer end.	
Estimated controlled emission to air (Coke Ovens)	PM- 28 kg/hr SO_2- 56 kg/hr NO_x- 45 kg/hr	PM- 4 kg/hr SO_2- 39 kg/hr NO_x- 59 kg/hr
Estimated controlled emission to air (DR based on COG as reductant)	PM- 7 kg/hr SO_2- 3 kg/hr NO_x- 10 kg/hr	Not considered as COG would not be generated
Total Load	PM- 35 kg/hr SO_2- 59 kg/hr NO_x- 55 kg/hr	PM- 4 kg/hr SO_2- 39 kg/hr NO_x- 59 kg/hr
There will be net reduction in generation of PM by about 30 kg/hr & SO_2 by 20 kg/hr due to the change in configuration to Heat recovery type Coke Oven.		
Water		
- Wastewater from primary gas cooling	Yes The water used for primary gas cooling mainly contains cyanide & phenol and need to be treated in BOD plant. The treated water from BOD plant would still contain cyanide & phenols, the outlet concentration of which should conform to the Effluent standards laid down in Iron & Steel Notification (GS.R.277(E) dated 31st March,2012)	No wastewater stream is generated. In Phase-1, there would be generation of wastewater from wet quenching coke, which would be treated for removal of suspended solids and recycled back to the system for quenching purpose.CDQ will be installed in Phase 2 and there would be no generation of such wastewater. After Phase 2
- Wastewater from equipment cooling	Yes, the wastewater from cooling circuit is treated and reused	Yes, the wastewater from cooling circuit is treated and reused
Solid waste		
- Coal tar sludge & BOD sludge	These sludge are considered hazardous and generally reused by blending with coal feed to the coke ovens leading to accumulation of pollutants like cyanide in the process	Not generated

It may be inferred that heat recovery type coke oven has the following advantages over by-product recovery type coke ovens:

i) For a production of 0.6 MTPA gross coke, the specific requirement of make-up water for by-product recovery type coke oven is much higher at about 1.9 cum/ton as against 0.72cum/ton of water requirement for heat recovery type

ii) There is no net discharge of waste water as the wastewater generated within the plant is treated and recycled. BOD plant is not required and there would be no cyanide & phenolic effluent generation.

iii) Since non-recovery ovens work under negative pressure, there is no fugitive emission from the ovens during operation.

iv) Organic compounds (VOCs) are fully oxidised during carbonisation, thereby eliminating its release to the atmosphere.

v) Efficient utilisation of energy to produce low cost electrical power reducing sourcing of the same from external sources.

vi) Production of gypsum during desulphurisation, which can be used for various sealing purposes of the oven and may be sold off to cement manufacturers

vii) Reduction of pollution load due to deletion of DRI plant which includes DRI exhaust emission and reduction of pollution load due to raw material and DRI handling in DRI circuit.

Hence, as per the deliberations above, it may be seen that the proposal for amendment in configuration of coke ovens from by-product recovery type to heat recovery type of identical production capacity would not lead to increase in pollution load, in terms of air emission. Also, there would be no generation of wastewater containing toxic components like cyanide and phenol, which may be considered as a major environmental advantage.

In view of the above, amendment of configuration in the EC dated 19th January, 2016 may kindly be considered.

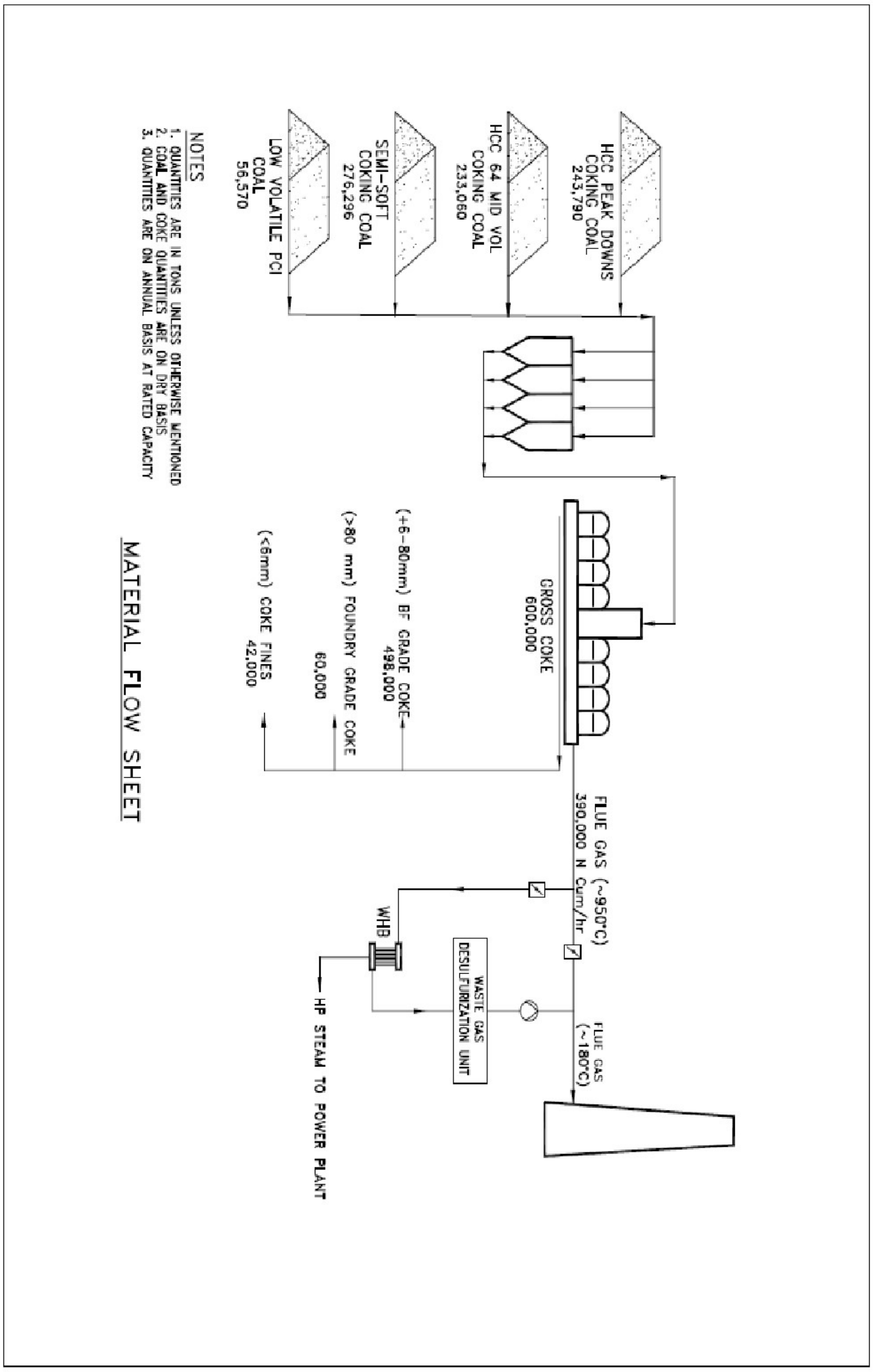
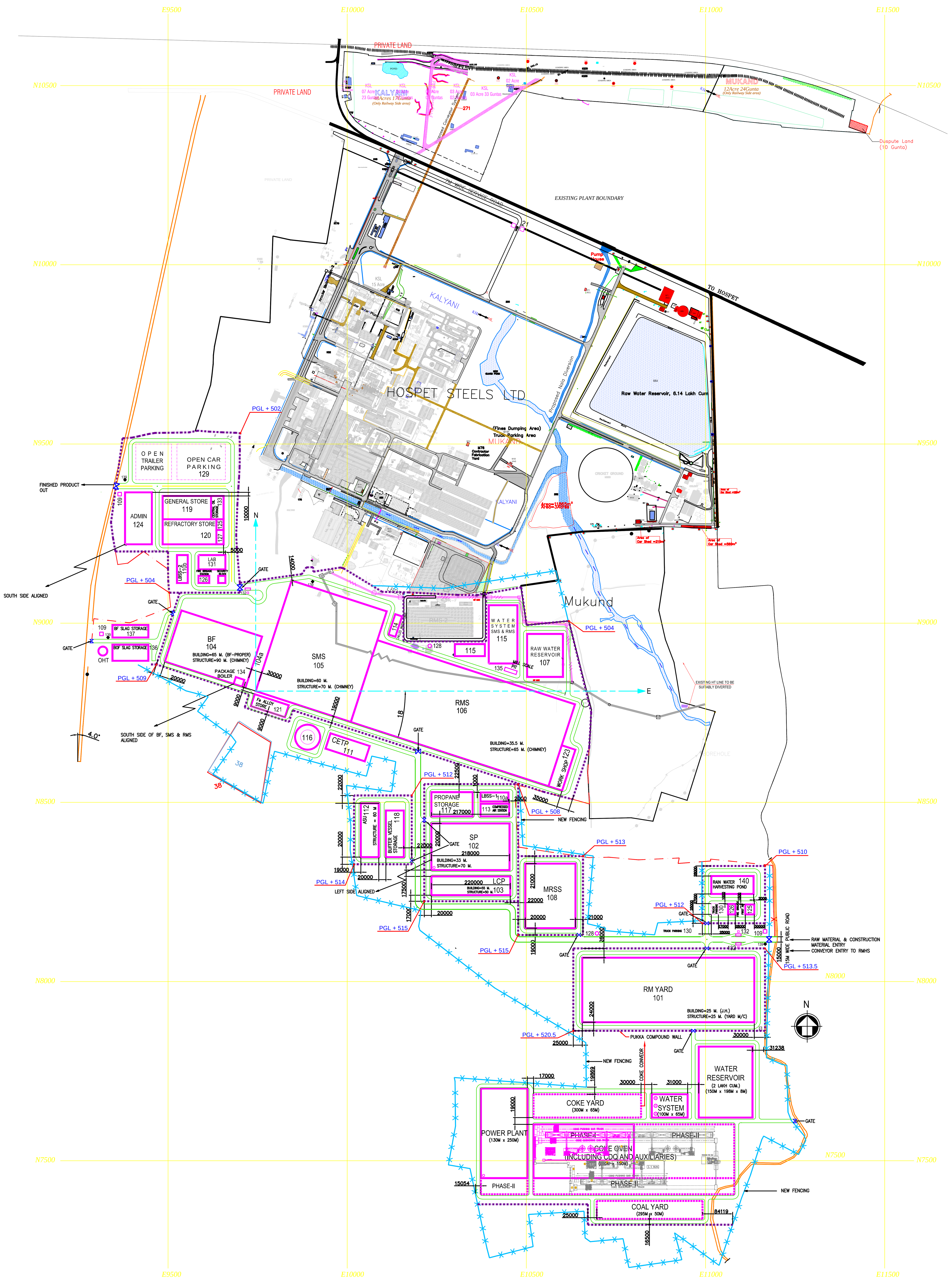
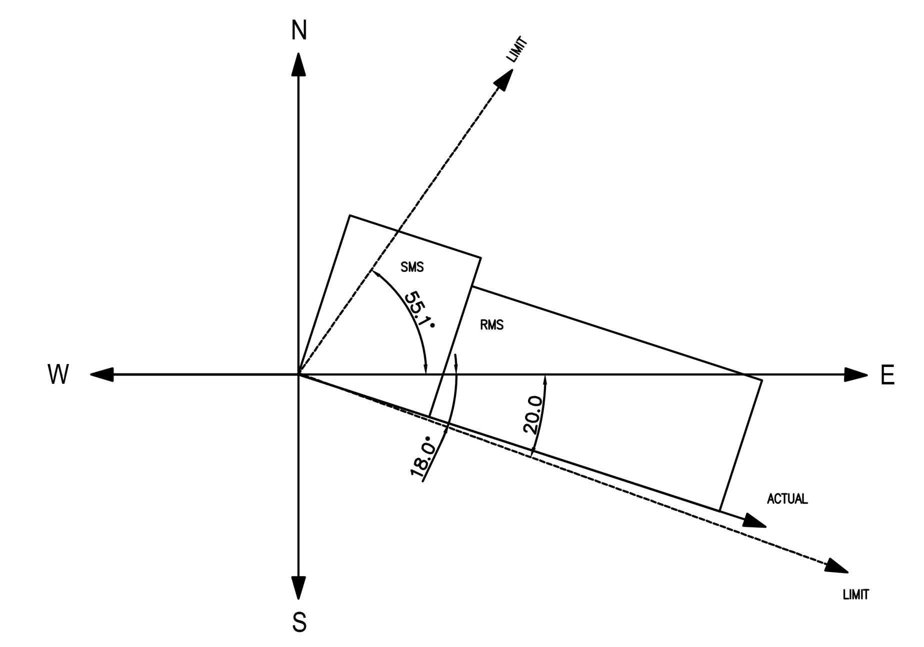


FIG. 1 - PROCESS FLOW DIAGRAM FOR PRODUCTION OF 0.6 MTPA GROSS COKE IN HEAT RECOVERY COKE OVENS





LEGEND:-

PHASE-I

101. RAW MATERIALS STORAGE YARD
102. SINTER PLANT -105 SQM
103. LCP
104. BLAST FURNACE -650 CUM
104a. HOT METAL TRANSFER BAY
105. STEELMELT SHOP
106. COMBINATION MILL
107. RAW WATER RESERVOIR & PUMP HOUSE
108. MRSS
109. GATE HOUSE
110a. LBSS-1
110b. LBSS-2
111. CETP AND RWTP
112. AIR SEPARATION PLANT
113. COMPRESSED AIR STATION
114. CHILLED WATER PLANT (MILL & COMPRESSED AIR STN.) AND CHILLED WATER PLANT (BF & SMS)
115. WATER SYSTEM FOR SMS & RM INCLUDING DRINKING WATER, DM & SOFTENING PLANT AND FIRE FITING PUMP HOUSE
116. LD GAS HOLDER
117. PROPANE STORAGE
118. BUFFER VESSEL STORAGE & PRS
119. GENERAL STORE
120. REFRACTORY STORE
121. FERRO ALLOY STORE
~~122. AREA STORE~~
123. WORK SHOP
124. ADMIN BUILDING
125. FIRST AID UNIT
126. FIRE BRIGADE STATION
127. CENTRAL KITCHEN
128. FOOD KIOSK
129. CAR/SCOOTER PARKING
130. TRUCK PARKING
131. CENTRAL LAB
132. WEIGH BRIDGE
133. CENTRAL OIL STORAGE
134. PACKAGE BOILER
135. MILL SCALE PIT
136. BOF SLAG STORAGE AND PROCESSING
137. BF SLAG STORAGE
138. CONSTRUCTION POWER SUB-STATION
139. ASSEMBLY POINT
140. RAIN WATER HARVESTING POND

EXISTING FACILITIES

PROPOSED FACILITIES

EXISTING PLANT BOUNDARY

OLD LAND BOUNDARY

ENTITY COMPOUND WALL

NEW FENCING