JSW Steel Limited

Dolvi Works: Geetapuram,
Dolvi, Taluka - Pen,
Dist Raigad - 402 107, Maharashtra, India.
CIN. : L27102MH1994PLC152925
Phone : +91 2143 277501-15
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Website : www.jsw.in

Ref.No : JSWSL/Pellet 9 MTPA/MoEF&CC/2018

Date: 26/07/2018.

To : The Member Secretary,
Expert Appraisal Committee,
Ministry of Environment, Forest & Climate Change,
Indira Paryavaran Bhawan,
Jor Bagh Road, Aliganj,
New Delhi- -110 003

Sub. : Submission of Environmental Appraisal report along with other requisite documents for grant of Amendment in Environment Clearance for changes in plant configuration for Proposed Expansion of Integrated Steel Plant from 5.0 MTPA to 10 MTPA at Village Dolvi, Raigad District, Maharashtra

Ref.: - EC letter no - J-11011/76/2013-IA II (I) dated 25th Aug, 2015

Dear Sir,

JSW Steel Ltd., Dolvi Works has received Environment Clearance for expansion of its integrated steel plant from 5 to 10 MTPA on 25th August, 2015 and subsequent amendment on 23/01/2018. The construction of various units for expansion from existing 5 MTPA to 10 MTPA of finished steel is ongoing. For the additional 5 MTPA production, a blast furnace of 4.5 MTPA and a DRI plant of 2 MTPA is considered as a part of iron production facility.

Over the years, the content of ore fines in the feed material has increased and is amenable for use in pellet plant rather than in sintering where the iron ore fines is coarser.

JINDAL Part of O.P. Jindal Group

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The existing BF1 is operated with a burden ratio of 70% sinter and 30% pellet. The proposed blast furnace (BF2) of 4.5 MTPA is designed to operate on 70 % pellet in the burden for enhancing the production of the furnace. The change in burden for new blast furnace is solely based on the reason that the yield increases as the slag production decreases due to less intake of sinter.

In view of the above, we are now proposing to install 9 MTPA Pellet plant in place of pellet plant of 4 MTPA initially considered for EC and reduce the proposed sinter plant capacity to 4 MTPA instead of 8 MTPA. The new pellet plant of 9 MTPA will cater to the 70 % feed in the new blast furnace.

In view of the above, we are herewith submitting the Environmental Appraisal Report along with other requisite documents for obtaining Amendment in Environmental Clearance from the Ministry of Environment, Forest & Climate Change, New Delhi. We humbly request you to kindly consider our case and grant us the Environment Clearance at the earliest.

Thanking you,

Yours faithfully,
For JSW Steel Ltd

G. S. Rathore
President (Dolvi & Salav)

APPENDIX I
(See Paragraph-6)

FORM 1

(I) **Basic Information**

Sl. No.	Item	Details
	Whether it is a violation case and application is being submitted under Notification No. S.O. 804 (E) dated 14.03.2017?	No
1	Name of the project Project Cost (in lacs)	Capacity Addition of Integrated Steel Plant from 5.0 Mtpa To 10.0 Mtpa and Captive Power Plant from 300 MW To 600 MW at JSW Steel Ltd., Dolvi Works, Dolvi Village, Raigad District, Maharashtra. -- Request for Amendments in Environmental clearance issued by MoEFCC vide letter no: J-11011/76/2013-IA II (I) dated 25th Aug, 2015. Rs. 1700000
2	S. No. of the schedule Project Sector	3(a) Metallurgical industries (ferrous & non-ferrous) Industrial Projects – 1
3	Proposed capacity /area/length/ tonnage to be handled/ command area/ lease area/ number of wells to be drilled	10.0 MTPA Finished Steel (Amendment in existing EC for changes in plant configuration without increasing / enhancing the approved plant capacity) Installation of 9 MTPA pellet plant in place of 4 MTPA pellet Plant and 4 MTPA sinter plant in place of 8 MTPA Sinter plant as proposed during EC
4	New/Expansion/Modernization MoEFCC file number (Previous EC)	Amendment in EC for Expansion proposal for 5 MTPA to 10 MTPA Finished Steel production. F. No. - J-11011/76/2013-IA II (I)
5	Existing Capacity/Area etc.	5 MTPA Finished products
6	Category of the Project i.e. 'A' or 'B'	A
7	Does it attract the general condition? If yes, please specify.	No
8	Does it attract the specific condition? If yes, please specify.	No
9	Location of the project	Geetapuram, Dolvi Village Pen Taluka, Raigad District, Maharashtra
	Shape of the project land	Polygon
	Plot/Survey/Khasra No.	Land comprises Dolvi, Jui Bapuji & khar Karavi Villages.
	Villages	Dolvi
	Tehsil	Pen
	District	Raigad
	State	Maharashtra
10	Nearest railway station along with	Pen is the nearest railway station at about 8 km (aerial

Sl. No.	Item	Details
	distance in kms. Nearest airport along with distance in kms.	distance) on the Konkan Railway line connecting Mumbai-Mangalore along the west coast of India. The nearest airport is Mumbai (national and international) located about 80 km in the north direction from the proposed project site.
11	Nearest Town, city, District Headquarters along with distance in kms.	Alibag 20 Km
12	Village Panchayats, Zilla Parishad, Municipal Corporation, Local body (complete postal addresses with telephone nos. to be given)	Grampanchayat, Dolvi.
13	Name of the applicant	Shri. G S Rathore
14	Registered Address	JSW Steel Limited, Dolvi Works Jindal Mansion, 5A, Dr. G. Deshmukh Marg, Mumbai – 400 026
15	Address for Correspondence:	
	Name	Shri. G S Rathore
	Name of the Company & Address	JSW Steel Limited, Dolvi Works Geetapuram, Village – Dolvi, Taluka – Pen, District – Raigad. Maharashtra - 402107.
	Name of the Applicant	Shri. G S Rathore
	Designation (Owner/ Partner/ CEO)	President (Dolvi & Salav)
	Pin Code	402 107
	E-mail	gajraj.rathore@jsw.in
	Telephone No.	02143 277501 – 15
	Fax No.	02143 277542
16	Details of Alternative Sites examined, if any. Location of these sites should be shown on a Toposheet	Not Applicable
17	Whether part of Interlinked Projects	No
18	Whether separate application of interlinked project has been submitted?	Not Applicable
19	If yes, MoEF file number date of submission	Not Applicable
20	If no, Reason	Not Applicable
21	Whether the proposal involves approval/ clearance under: if yes, details of the same and their status to be given.	No
	a) The Forest Conservation) Act, 1980?	Not Applicable
	b) The Wildlife (Protection) Act, 1972?	Not Applicable
	c) The C.R.Z Notification, 2011?	Not Applicable
22	Whether there is any Government Order/Policy relevant/relating to the site?	No
23	Whether any Forest land involved? Area of Forest land Involved	No

Sl. No.	Item	Details
	(hectares)	
24	Whether there is any litigation pending against the project and/or land in which the project is propose to be set up?	No
	a) Name of the Court	NA
	b) Name of the Sub Court	NA
	c) Case no.	NA
	d) Orders/directions of the Court, if any and its relevance with the proposed project	NA

Activity

1. **Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)**

S. No.	Information / Checklist confirmation	Yes/ No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	Yes	The company has already a total of about 1200 acres of land in its possession for its existing operating integrated steel plant complex of 5.0 MTPA capacity. Some of the proposed additional capacities are proposed to be setup within the existing plant and some need relocated by acquiring additional 600 acres land.
1.2	Clearance ofexisting land, vegetation and buildings?	Yes	There will be clearance of existing land, vegetation wherever required. The proposed area is generally plain area with slight undulation.
1.3	Creation of new land uses?	Yes	Some of the proposed facilities will be constructed within the existing industrial area and some require land to be acquired adjacent to the existing plant boundary.
1.4	Pre-construction investigations e.g. bore holes, soil testing?	Yes	Detailed land survey, topographical surveys and soil testing / investigation studies have been carried out earlier for existing plant while the land which is to be acquired has neither been surveyed, nor topographical surveys or soil testing /investigation have been done.
1.5	Construction works?	Yes	Installation of additional facilities for additional 5.0 MTPA Steel production and 300 MW Captive Power Plant and support infrastructure such as township, raw water reservoir and railway sidings will be expanded / constructed.
1.6	Demolition works?	No	Not Applicable
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	Temporary construction offices will be set up during the construction stage, which will be removed later.

S. No.	Information / Checklist confirmation	Yes/ No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations	Yes	Excavation works will be carried out for constructing the civil structures of the facilities. The project requires filling, levelling and piling works.
1.9	Underground works including mining or tunneling?	No	Not Applicable
1.10	Reclamation works?	No	Not Applicable
1.11	Dredging?	No	Not Applicable
1.12	Offshore structures?	No	Not Applicable
1.13	Production and manufacturing processes?	Yes	The brief of manufacturing units and process flow of integrated steel plant at 10 MTPA stage is presented in **Annexure-I**.
1.14	Facilities for storage of goods or materials?	Yes	Storage facilities are planned for raw material and finished goods.
1.15	Facilities for treatment or disposal of Solid waste or liquid effluents?	Yes	The waste water generated from the indirect cooling circuit would be routed through the cooling tower and pressure filter for recycling purpose. The wastewater generated from the coke ovens will be treated in a bio-oxidation plant to reduce the level of phenolic compounds, oil & grease and cyanide. The treated wastewater will be reused in the system. The wastewater of gas cleaning plants of blast furnace and steel melt shop containing suspended solids will be clarified in the wastewater treatment plant. The clarified water will be recycled to the waste gas cleaning units. Similarly, the wastewater coming out from the continuous casting machine will be treated to remove scale and oil and the treated water will be recycled after cooling. The plant sanitary waste water will be treated in sewage treatment plant and the treated water will be used for dust suppression and maintenance of plant green belt.
1.16	Facilities for long term housing of operational workers?	Yes	It is proposed to create housing complex for employees / construction workers.
1.17	New road, rail or sea traffic during construction or operation?	Yes	Augmentation of port, road and rail facilities for receipt of additional raw

S. No.	Information / Checklist confirmation	Yes/ No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
			materials and dispatch of additional products.
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	Yes	Augmentation of port, road and rail facilities for receipt of additional raw materials and dispatch of additional products.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	Not envisaged
1.20	New or diverted transmission lines or pipelines?	Yes	It is proposed to relocate the existing MSDS to a new location.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	Yes	The plant drainage network will be planned and designed in line with the existing topography and systems.
1.22	Stream crossings?	No	Not envisaged
1.23	Abstraction or transfers of water from ground or surface waters?	Yes	The total water requirement for the 10.0 MTPA steel plant, 600 MW power plant and township will be about 116 MLD. At present JSW Steel Ltd., Dolvi Works has been allocated about 58.6 MLD water from Amba river, Nagothane, K.T.Bandhara. Application is in progress for the balance amount.
1.24	Changes in water bodies or the land surface affecting drainage or runoff?	No	The plant drainage network will be designed such that there are no significant alterations in the existing drainage network.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Construction materials, mechanical and electrical materials will be sourced from different parts of the state and as well as various part of country through road, rail and sea network.
1.26	Long-term dismantling or decommissioning or restoration works?	No	Not envisaged.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	Not envisaged
1.28	Influx of people to an area in either temporarily or permanently?	Yes	The requirement of total manpower for proposed expansion project will be about 5,000. However, the proposed Integrated steel plant will additionally generate more than 15,000 indirect secondary and tertiary employment.
1.29	Introduction of alien species?	No	Not envisaged
1.30	Loss of native species or genetic diversity?	No	Not envisaged
1.31	Any other actions?	No	-

2. **Use of natural resources for construction or operation of the project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):**

S. No.	Information / checklist confirmation	Yes/ No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	Yes	Additional 600 acres land is required for the proposed project.
2.2	Water (expected source & competing users)	Yes	The total water requirement for the 10.0 MTPA steel plant, 600 MW power plant and township will be about 116 MLD. At present JSW Steel Ltd., Dolvi Works has been allocated about 58.6 MLD water from Amba river, Nagothane, K.T.Bandhara. Application is in progress for the balance amount.
2.3	Minerals	Yes	The additional raw material requirement for the proposed capacity expansion is given in **Annexure II**.
2.4	Construction material - stone, aggregates, sand / soil (expected source - MT)	Yes	-Cement – 0.85 million tonnes -Coarse aggregates – 1.25 million cu.m. -Fine aggregates – 0.85 million cu.m -Reinforcement steel – 0.125 million tonnes -Structural Steel – 0.35 million tonnes
2.5	Forests and timber (source - MT)	No	No timber use is envisaged in the proposed expansion project.
2.6	Energy including electricity and fuels (source, competing users) Unit: Fuel (MT),Energy (MW)	Yes	The total power requirement is proposed to be supplied from the captive power plant of 600 MW capacity. Some power would also be available from the top pressure recovery turbine generators of the blast furnace & CDQ. Any additional power requirement (if any) will be met from the local grid.
2.7	Any other natural resources (use appropriate standard units)	No	Not envisaged

3. **Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.**

Sl. No.	Information / Checklist confirmation	Yes / No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna and water supplies)	Yes	In-built safety features of the plant and machinery would be made adequate in order to avoid hazardous events causing damage to the life and property.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	Not envisaged

3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	Standard of living of the population surrounding the proposed project area is likely to be further improved.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,	No	Not envisaged
3.5	Any other causes	No	-

4. Production of solid wastes during construction or operation or decommissioning (MT/month).

Sl. No.	Information / Checklist confirmation	Yes / No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	Yes	No major spoil or overburden will be generated at the project site during land development. However, the spoil or earthwork generated during construction will be reused for construction.
4.2	Municipal waste (domestic and or commercial wastes)	Yes	All municipal solid waste generated from the sewage treatment plant will be used within the plant site for plantation as manure.
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)	Yes	The oil sludge from the oil storage area and oil & grease removed from the wastewater treatment plant will be sold to authorized users/recyclers approved by state pollution control board.
4.4	Other industrial process wastes	Yes	Major solid waste generated from the industrial processes would include BF slag, gas cleaning plant sludge, ESP/bag filter dust, refractory debris, etc. All the solid waste described above would be recycled/used in a proper manner / sinter plant and the rejects would be dumped in a designated area.
4.5	Surplus product	No	Not envisaged
4.6	Sewage sludge or other sludge from effluent treatment	Yes	Process sludge generated from the plant will be used as raw material in sinter plant. The sewage sludge from the STP will be used within the plant premises as organic manure.
4.7	Construction or demolition wastes	Yes	Small quantity of metallic scrap waste expected and the same will be used as melting scrap in steel making. Construction material will be used internally for filling and leveling of the sites within the plant site area.
4.8	Redundant machinery or equipment	No	Not envisaged
4.9	Contaminated soils or other materials	No	Not envisaged
4.10	Agricultural wastes	No	Not envisaged
4.11	Other solid wastes	No	Not envisaged

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

S. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	Yes	There may be some increase in levels of SO2, NOx, PM_{10}, $PM_{2.5}$ & CO in ambient air from sources as follows: Stationary Sources: During construction Emissions from Asphalt and Hot Mix plants, this will be limited to short period. **During operation as given in clause 5.2.** **Mobile Sources:** During construction phase it will be from movement of material transport vehicles & heavy earth moving machineries, equipment, etc. This will be for short period limited to construction phase. During operation phase it will be during transport of materials, which will be mostly by Rail.
5.2	Emissions from production processes	Yes	Emitted quantity from production processes - stationary sources (Kg/hr): Stack Emissions at 5 MTPA Stage: PM = 389.9 kg/hr SO_2 = 197.6 kg/hr NOx = 840.2 kg/hr From Pellet Plant, Sinter Plant, Coke Oven Plant, Blast Furnace, Direct Reduction Plant, Calcining Plant, Slab Caster Shop, BOF caster, LF & RH-Degasser Shop and Rolling Mills, SO_2, NOx, dust, TSP, CO_2, PAH, VOCs, heat and dust will be generated. The principal air pollution control system for pellet plant, sinter plant, DR Plant would be dedusting and waste gas cleaning systems separately. The coke oven gas generated in the coke ovens of Dolvi Coke Projects Limited after by-product recovery would be utilized as supplementary fuel for proposed steel plant complex.

S. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
			The top gas coming from the blast furnace would be cleaned by taking the gas through BF gas cleaning device for separation of particulate before the clean gas is recovered for meeting in-plant energy demand. The stock house and cast house areas would be provided with proper DE/FE systems complete with ESPs and stacks. The LD gas generated in the SMS shop would be subjected to cleaning before it is used as plant supplementary fuel. There would be proper FE systems to capture any secondary fumes generated during hot metal and liquid steel transfer points. Dust emissions from calcining plant would be controlled by bag filters. The re-heating furnaces would generate particulates, SO2, NOx and CO. The combustion system would incorporate low NOx burner system and controlled combustion.
5.3	Emissions from materials handling including storage or transport	Yes	Fugitive dust will be generated from the material handling activities. Dust suppression or dust extraction systems with bag filters along with water sprinklers will be provided to prevent the fugitive dust emissions. Further, the development of Greenbelt would prevent the fugitive dust emissions.
5.4	Emissions from construction activities including plant and equipment	Yes	Fugitive Dust.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	Yes	Dust emissions from raw material handling and construction materials are envisaged. Suitable dust suppression and dust extraction methods will be followed. There is no possibility of any odour generation as there are no organic solvents/processes involved. There is a possibility of odour from sewage; however, this can be reduced by maintaining good ventilation conditions.
5.6	Emissions from incineration of waste	No	Not envisaged

S. No.	Information/Checklist confirmation	Yes/ No	Details there of (with approximate quantities/rates, wherever possible) with source of information data
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	Not envisaged
5.8	Emissions from any other sources	No	Not envisaged

6. Generation of Noise and Vibration, and Emissions of Light and Heat

Sl. No.	Information / Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	Noise will be generated from Sinter plant, Blast furnace, Rolling mills, continuous caster and Oxygen plant which will not be allowed to exceed 85 dB (A).
6.2	From industrial or similar processes	Yes	Blast furnace, pellet plant, sinter plant, DR Plant, Rolling mills, continuous casting machines and Oxygen plant are likely to generate noise. The expected noise level will not be allowed to exceed 85 dBA or proper noise protection systems will be used whenever required. There will be no adverse effect on the ambient Noise. Waste heat recovery unit is proposed for the proposed Sinter Plant and CDQ & Waste heat boiler is proposed for the Coke Oven Plant, so that no heat shall be wasted.
6.3	From construction or demolition	Yes	Yes. This will be in the range of about 65-80 dB(A). Regular maintenance of the equipment will help in reducing these noise levels.
6.4	From blasting or piling	Yes	Some noise <85 dB (A) will be generated.
6.5	From construction or operational traffic	Yes	The noise levels are expected to be in the range of about 70-75 dB(A).
6.6	From lighting or cooling systems	No	Not envisaged
6.7	From any other sources	No	Not envisaged

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	No	All hazardous waste handled / disposed as per applicable rules from statutory authorities.

7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	No	The sewage water will be treated and used for greenbelt development within the premises. Outside discharge is not envisaged. The wastewater from the plant units will be treated at the individual source of generation and re-used or re-cycled into the processes. There will not be any external discharge of wastewater.
7.3	By deposition of pollutants emitted to air into the land or into water	No	There is no discharge of wastewater outside the plant.
7.4	From any other sources	No	Not envisaged
7.5	Is there a risk of long term build-up of pollutants in the environment from these sources?	No	Not envisaged

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

Sl. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	There is a possibility of oil spillages and fires from the storages. However, suitable risk assessment will be carried out and disaster management plan will be in place.
8.2	From any other causes	No	Not envisaged
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides,	No	The area is generally flat land. There is no record of occurrence of floods, landslides, cloud bursts etc. The proposed project site falls in Zone-IV as per IS-1893 (Part-I):2002.

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting. Facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.:	Yes	Existing and ancillary facilities will improve.
	a. Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.)	Yes	Existing infrastructure facilities will be expanded / extended to take care of the project.

Sl. No	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
	b. Housing development	Yes	New facilities about 10 km North of plant, away from pre-dominant wind direction.
	c. Extractive industries	No	The proposed facilities are captive to JSW
	d. Supply industries	Yes	Existing supply chain will improve
	e. Other		--
9.2	Lead to after-use of the site, which could have an impact on the environment	Yes	The proposed project will have impact on environment. However, these impacts will be contained by adopting suitable mitigation measures.
9.3	Set a precedent for later developments	Yes	Ancillary industries will be developed as a consequence.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	Yes	The industry is not located in a critical zone. There are not many major industries operating in this region. Hence, no major effects are envisaged.

(II) **Environmental Sensitivity**

Sl. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) from proposed project boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	No	There are no ecological, landscapes, cultural or other related sensitive areas in 15 –km radius.
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, Forests	Yes	There are no national parks, sanctuaries in 15-km radius from proposed project site. Following water bodies are within 15km radius from proposed project site. 1. Amba river 0.1 – km, W 2. Bhogeswar river 7.8-km, N 3. Creek adjacent to the plant is having tidal influence.
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Yes	Four reserve forests exist in 15 Km radius area as listed below: • RF near Kharkhara village (1- km, E) • RF near Katkariwadi village (5.3- km, NE) • RF near Turmal village (4.6-km, E) • RF near Katvira village(5.1- km, SW) • RF near Dhavte village(8.5-km NE) Detailed flora and fauna studies were conducted and details are incorporated in EIA report.
4	Inland, coastal, marine or underground waters	Yes	Amba river 0.1 – km, W Bhogeswar river 7.8-km, N Creek 0.1 – km, W

Sl. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) from proposed project boundary
5	State, National boundaries	No	Nil
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	No	Not applicable
7	Defence installations	No	Nil within 10-km radius
8	Densely populated or built-up area	Yes	Pen Taluka is 6.9-km from the plant site.
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Yes	Pen Taluka has all the facilities such as primary schools, middle schools, high schools, hospitals health centres, public health sub centres, dispensaries and places of worship.
10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)	No	No scarce resources are present in 15-km radius
11	Areas already subjected to pollution or environmental damage, (those where existing legal environmental standards are exceeded)	No	This is not a listed or critically polluted area.
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions)	No	The proposed project site falls in zone-IV as per IS-1893 (Part-I): 2002. No landslides / flooding is envisaged in project area.

(III) **Proposed Terms of Reference for EIA Studies:**

JSW has already obtained Environmental Clearance for Expansion of Integrated Steel Plant from 5 MTPA to 10 MTPA finished steel production capacity from MoEFCC vide letter no F. No. J-11011/76/2013-IA II (I) dated 25th Aug, 2015.

The present proposal is for amendment in existing EC for changes in Plant configuration. No ToRs are being proposed for the same.

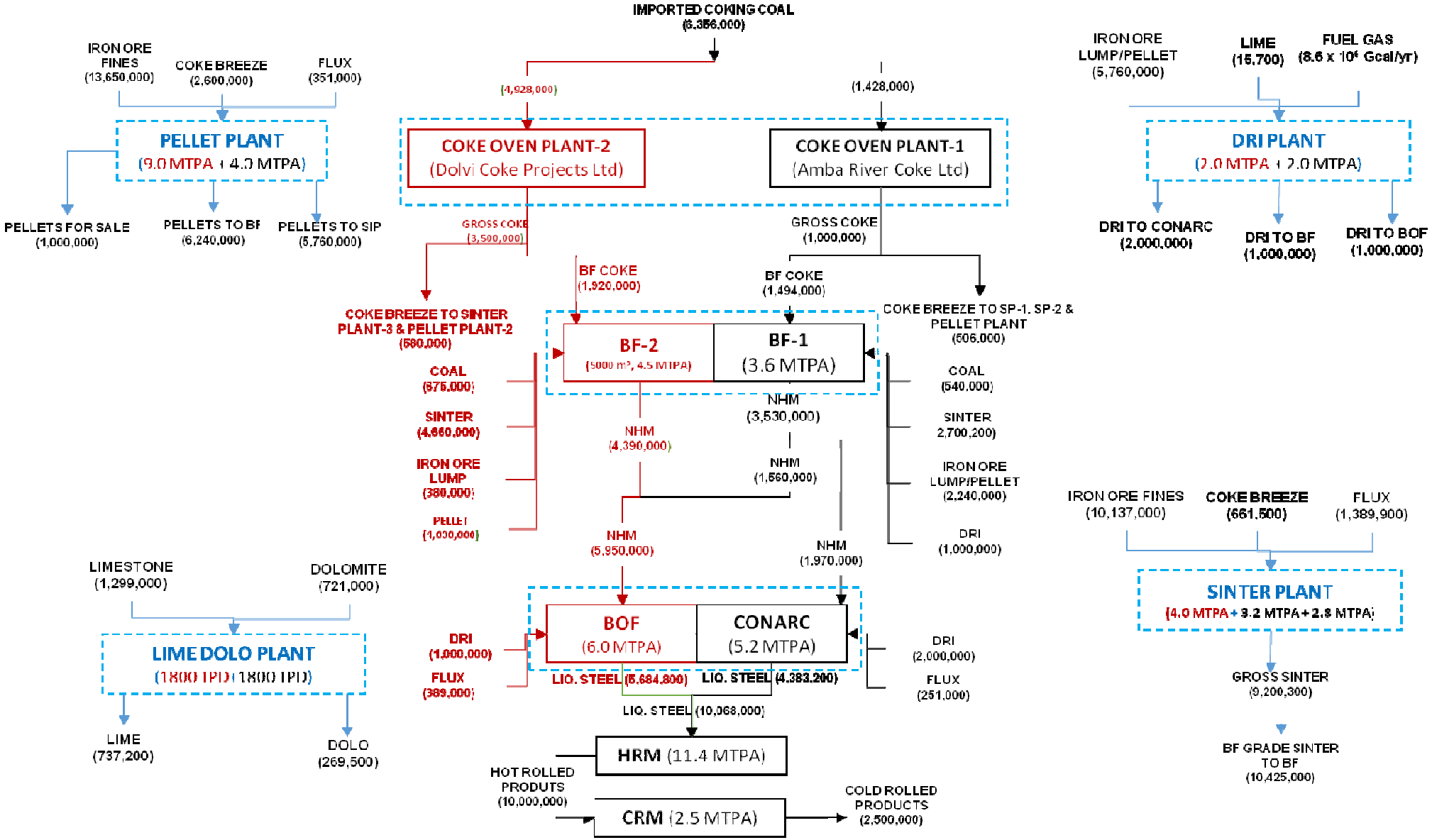
I hereby given undertaking that the data and information given in the application and enclosure are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and Clearance give, if any to be the project will be revoked at our risk and cost.

Date: 26/07/2018
Place: Dolvi

G. S. Rathore
For JSW Steel Limited
Geetapuram, Village – Dolvi,
Taluka – Pen,
District – Raigad
Maharashtra 402107.

Annexure I

Process flow, Raw Material and Product Balance at 10 MTPA stage



Annexure II

Additional Raw Material Requirement for 5 MTPA to 10 MTPA Expansion

Sl. No.	Raw material	Quantity (tpa)
1.	Iron Ore Fines/Conc. (For Pellet Plant)	8,528,614
2.	Iron ore fines (for sinter plant)	3,440,000
3.	Iron Ore Lumps	380,000
4.	Non-coking coal for PCI	675,000
5.	Limestone (for sinter plant)	245,500
6.	Limestone (for pellet plant)	504,941
7.	Dolomite (for sinter plant)	251,500
8.	Dolomite (for pellet plant)	270,000
9.	Quartzite	60,000
10.	Limestone (for SMS)	860,000
11.	Dolomite (for SMS)	388,000
12.	Ferro-Alloy (for SMS)	103,600
13.	Bentonite (For pellet plant)	45,000

ENVIRONMENTAL APPRAISAL REPORT

Amendment in EC for Expansion of Steel Plant from 5 MTPA to 10 MTPA for Changes in configuration of Proposed Sinter Plant & Pellet Plant

(EC letter no J-11011/76/2013-IA II (I) dated 25th Aug, 2015)

JSW Integrated Steel Plant, Dolvi

At Village Dolvi, Raigad District, Maharashtra

MEC/11/S2/Q7GF/EAR/2479/R.0. July, 2018

JSW Steel Ltd

JSW Steel Ltd, Dolvi

Project Proponent

MECON LIMITED
(A Govt. of India Enterprise)
Vivekananda Path
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Certificate no: NABET/EIA/1619/RA 0068

Environmental Consultant

Quality Council of India

National Accreditation Board for Education & Training

CERTIFICATE OF ACCREDITATION

MECON Limited

Vivekanand Path, P.O Doranda, Ranchi - 834002

are accredited as Category - A organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA/EMP reports in the following sectors:

Sl. No.	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast/ underground mining	1	1 (a) (i)	A
2	Offshore and onshore oil and gas exploration, development & production	2	1 (b)	A
3	River Valley projects	3	1 (c)	A
4	Thermal power plants	4	1 (d)	A
5	Nuclear power projects and processing of nuclear fuel	5	1 (e)	A
6	Coal washeries	6	2 (a)	A
7	Mineral beneficiation including pelletisation	7	2 (b)	A
8	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	A
9	Oil & gas transportation pipeline (crude and refinery/ petrochemical products), passing through national parks/ sanctuaries/coral reefs /ecologically sensitive Areas including LNG terminal	27	6 (a)	A
10	Isolated storage & handling of hazardous chemicals (As per threshold planning quantity indicated in column 3 of Schedule 2 & 3 of MSIHC Rules 1989 amended 2000)	28	6 (b)	B
11	All ship breaking yards including ship breaking units	30	7 (b)	A
12	Industrial estates/ parks/ complexes/ Areas, export processing zones(EPZs), Special economic zones (SEZs), Biotech parks, Leather complexes	31	7 (c)	A
13	Ports, harbours, break waters and dredging	33	7 (e)	A
14	Highways	34	7 (f)	A
15	Townships and Area development projects	39	8 (b)	A

Note: Name of approved EIA Coordinators and Functional Area Experts are mentioned in RA AC minutes dated July 14, 2017 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/17/0369 dated Aug. 09, 2017.The accreditation needs to be renewed before the expiry date by MECON Limited, Ranchi, following due process of assessment.

Sr. Director |NABET
Dated: Aug. 09, 2017

Certificate No.
NABET/ EIA/1619/ RA 0068

Valid till Date
02.10.2019

For the updated List of Accredited Consultants with approved sectors please refer QCI-NABET website.

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Environmental Appraisal Report

1.0 INTRODUCTION

1.1 Project Proponent

The JSW Group is amongst the leading conglomerates in India, with presence across the vital sectors of the Indian economy. The Flagship Company of JSW Group, JSW Steel is one of India's leading integrated steel manufacturers with a capacity of over 18 MTPA. It is one of the fastest growing companies in India with footprint in over 140 countries.

From humble beginnings with a single plant in 1982, JSW Steel is now India's leading manufacturer of value-added and high-end steels. With state of the art manufacturing facilities located in Karnataka, Tamil Nadu and Maharashtra, it is recognised for its innovation and quality. JSW produces a wide gamut of steel products that include Hot Rolled, Cold Rolled, Bare & Pre-Painted Galvanised & Galvalume, TMT Rebars, Wire Rods and Special Steel. JSW Steel is scaling up existing plants and opening new ones to take that figure to 40 MTPA.

The integrated steel plant at Dolvi is currently at a production capacity of 5 MT annual steel production. Located on the west coast of India, the plant has a jetty with a capacity of 10 million tonnes per annum. This provides the unit with logistical advantages in importing raw materials and savings on freight cost.

Located around 80 kms from Mumbai, the unit is well connected through rail, road and sea and has given the JSW Steel a strategic presence in western India. Dolvi steel plant caters to several industries including automotive, projects and construction, machinery, LPG cylinder-makers, cold rollers, oil and gas sector and consumer durables.

Dolvi plant is the first steel plant in India to adopt a combination of CONARC technology for steelmaking and compact strip production (CSP) for producing hot rolled coils. The main feature of CSP is thin slab casting. It can produce coils with thickness as low as 1.2 mm.

1.2 Location of the Project

Existing Plant is located at about 8 km from Pen Railway Station (on Mumbai – Goa Broad Gauge main railway line). The National Highway no NH-17 touches eastern side of steel plant. The steel plant is 8 km from Pen and 40 km from proposed Navi Mumbai international airport. Nearest Railway station is Pen on Konkan railway and nearest port is JNPT, which is more than 20-22 km away. There is no national park/wildlife sanctuary/ecologically sensitive area within 10 km of the plant. The project General Layout for existing units and proposed expansion is attached as Annexure 1.1.

1.3 Present Plant Configuration

JSW Steel Ltd, Dolvi Works has been granted Environmental Clearance (EC) for expansion of its integrated steel plant from 5 MTPA to 10 MTPA of finished product vide letter no J-11011/76/2013-IA II (I) dated 25th Aug, 2015. The EC letter was further amended to exclude the proposed 1.0 MTPA & 2.5 MTPA coke oven units and

transfer the same to Dolvi Coke Projects Limited (A Sister Company) and 10 MTPA Slag and clinker grinding unit to JSW Cement Limited (A Sister Company). The copy of the amended EC letter is attached as Annexure 1.2. Production capacity of various units before and after the proposed Expansion from 5 MTPA to 10 MTPA as per revised EC are given in Table 1.1 below.

Table 1.1- Production capacity of different units proposed during 5 MTPA to 10 MTPA Expansion as per revised EC

Sl No.	Unit Name	Capacity (MTPA)	Present Status of Installation
1	DRI (Gas based Mega Module)	2	Work yet to start
2	Pellet Plant	4	Work yet to start
3	Sinter Plant	2X4	Work yet to start
4	Blast furnace including pig casting	4.5	Work in progress
5	SMS-BOF	6	Work in progress
6	Ladle Furnace(LF)	2X300t	Work in progress
7	VD/VOD & RH-TP	2X300t	Work in progress
8	Conventional Slab Caster	5.72	Work in progress
9	Billet Caster	1.5	Operational
10	CRM	1.5	Work yet to start
11	Lime/dolo Plant	1800 tpd	Work in progress
12	Oxygen Plant	3500 tpd	Work in progress
13	Hot Rolling Mill	5	Work in progress
14	Bar Mill	1.4	Operational
15	Slag & Clinker grinding unit	10	Work in progress
16	Captive Power Plant	300	Work in progress
17	Township(Area)	150 Acres	Work yet to start

1.4 Present Proposal

As per the revised EC for expansion from 5 MTPA to 10 MTPA, it was proposed to install two similar sinter plants of 360 m^2 bed area having production capacity of 4 MTPA each. Additionally, a pellet plant having production capacity of 4 MTPA was also proposed.

Keeping in view of technological advancements in charging of Blast furnace, availability of raw material, capital & operational costs, JSW is now proposing to install 9 MTPA Pellet plant in place of pellet plant of 4 MTPA initially considered for EC, also limiting sinter plant capacity to 4 MTPA instead of 8MTPA.

In view of the proposed changes in plant configuration, the present proposal is submitted for amendment in EC for expansion of Integrated Steel Plant at Dolvi from 5 MTPA to 10 MTPA of finished products under Section 7(ii) of the EIA notification for further consideration by EAC.

1.5 Justification for the Project

JSW Dolvi works is undergoing expansion from existing 5 MTPA to 10 MTPA of finished steel. For the additional 5 MTPA production, a blast furnace of 4.5 MTPA and a DRI plant of 2 MTPA is considered as a part of iron production facility.

Over the years, the content of ore fines in the feed material has increased and is amenable for use in pellet plant rather than in sintering where the iron ore fines is coarser.

The existing BF1 is operated with a burden ratio of 70% sinter and 30% pellet. The new blast furnace (BF2) of 4.5 MTPA is designed to operate on 70 % pellet in the burden for enhancing the production of the furnace. The change in burden for new blast furnace is solely based on the reason that the yield increases as the slag production decreases due to less intake of sinter. The new pellet plant of 9 MTPA will cater to the 70 % feed in the new blast furnace.

2.0 PROJECT DETAILS

2.1 Introduction

The EC for expansion of Integrated Steel Plant of JSW Steel at Dolvi was granted in August 2015. After obtaining prior EC & CTE for various units, the construction activities were started. The plant is presently under construction phase.

2.2 Existing Plant Configuration

JSW Steel is presently operating at 5 MTPA production capacity. The production of steel at this stage is through coke oven-pelletization-Sintering-BF-BOF–LF–VD/VOD degasser-slab/billet caster-HSM/Plate mill/Bar Mill route. The plant is proposed to be equipped with coke oven complex, pellet plant complex, sinter plant, blast furnace, CONARC, BOF, ladle furnace, vacuum degasser, continuous casting facility, plate mill for the production of hot rolled plates, CRM for value addition and 300 MW Captive Power Plant. Supporting facilities up to production of finished products will also be set up in the plant based on the state-of-the-art clean technology.

However, as explained earlier, DCPL will install and operate coke oven along with by-product plant. Hence, the required coke will be supplied by DCPL to JSW steel. Remaining proposed units and technology will be remaining the same. The details of the existing configuration are given in Table 2.1.

Table 2.1 – Details of various units of JSW Steel Plant at 5 MTPA stage

Sl No.	Unit Name	Existing capacity at 3 MTPA	3 MTPA to 5 MTPA as per EC	Total proposed Capacity at 5 MTPA stage	Present Status of Installation
1	DRI (Gas based Mega Module)	1.2	0.8 MTPA by augmenting	2.0 MTPA	In operation
2	Pellet Plant	-	4.0 MTPA (ARCL)	4.0 MTPA	In operation
3	Coke Oven including By-product plant	1.0 (ARCL)	1.0 MTPA (New)	2.0 MTPA	New 1.0 MTPA transferred to DCPL
4	Sinter Plant	2.8	3.2 MTPA	6.0 MTPA	In operation 2.5 MTPA
5	Blast furnace including pig casting	2.0	1.6 MTPA	3.6 MTPA	In operation 3.5 MTPA
6	SMS(CONARC)	3.0	2.2 MTPA by augmenting existing facilities	5.2 MTPA	In operation 5.2 MTPA
7	Ladle Furnace(LF)	2X200t	1X250t	2X200t+250t	In operation
8	VD/VOD & RH-TP	1X200t	1X205t	1X200t+ 1X205t	Work yet to start
9	CSP(HRC Coil) Thin Caster-cum-	3.0	0.5 MTPA by augmenting	3.5 MTPA	In operation

	Hot Strip Finishing Train				
10	Conventional Slab Caster	-	2X1 Strand 3.68 MTPA	2X1 Strand 3.68 MTPA	In operation
11	Plate Mill	-	1.5 MTPA	1.5 MTPA	Work yet to start
12	CRM	-	1.0 MTPA	1 MTPA	Work yet to start
13	Galvanizing Line	-	0.6 MTPA	0.6 MTPA	Work yet to start
14	Electrical Steel CRGO Line	-	0.4 MTPA	0.4 MTPA	Work yet to start
15	Tin Plate Mill	-	0.4 MTPA	0.4 MTPA	Work yet to start
16	Colour Coating line	-	0.5 MTPA	0.5 MTPA	Work yet to start
17	Lime/dolo Plant	600 tpd	1200 tpd	1800 tpd	In operation 1200 tpd
18	Oxygen Plant	1600 tpd	2500 tpd	4100 tpd	In operation 1660 tpd Additional 1000 tpd established
19	Captive Power Plant	-	300 (Based on surplus of BF & CO gases + RLNG)	300 (Based on surplus of BF & CO gases + RLNG)	In Operation 55 MW

2.3 Proposed changes

In the earlier proposal for expansion of steel production capacity from 5 MTPA to 10 MTPA, JSW Steel has proposed for setting up of two identical sinter plants of 4 MTPA sinter production capacity each and one pellet plant of 4 MTPA production capacity. As part of the present proposal, JSW is proposing to remove one of the proposed sinter plants and is in place of proposed 4 MTPA pellet plant, install a bigger pellet plant of 9 MTPA capacity. The pellet plant layout showing location of various proposed facilities is attached as Annexure 2.1. Details of the JSW Steel plant configuration before and after the present proposal are given in Table 2.2.

Table 2.2 – Details of various units of JSW Steel Plant at 10 MTPA stage

Sl No.	Unit Name	Plant units& capacities at 5 MTPA stage (A)	Units proposed during 5 MTPA to 10 MTPA Expansion for which EC already accorded (B)	Present proposal during 5 MTPA to 10 MTPA Expansion in (B)	Total units and capacities after the proposal	Remarks
1	DRI (Gas based Mega Module)	2.0 MTPA	2.0 MTPA	No Change	4.0 MTPA	No Change
2	Pellet Plant	4.0 MTPA	4.0 MTPA	9.0 MTPA in place of 4 MTPA	13.0 MTPA	Increase by 5 MTPA
3	Coke Oven including By-product plant	1.0 MTPA	-	No Change	1.0 MTPA	No Change
4	Sinter Plant	6.0 MTPA	8.0 MTPA	4.0 MTPA in place of 8 MTPA	10.0 MTPA	Decrease by 4 MTPA
5	Blast furnace including pig casting	3.6 MTPA	4.5 MTPA	No Change	9.1 MTPA	No Change
6	SMS(CONARC)	5.2 MTPA	-	No Change	5.2 MTPA	No Change
7	SMS(BOF)	-	6.0 MTPA	No Change	6.0 MTPA	No Change
8	Ladle Furnace(LF)	2X200t+250t	2 X 300 T	No Change	2X200t+250t + 2 X 300 T	No Change
9	VD/VOD & RH-TP	1X200t+ 1X205t	2 X 300 T	No Change	1X200t+ 1X205t + 2 X 300 T	No Change
10	CSP(HRC Coil) Thin Caster-cum-Hot Strip Finishing Train	3.5 MTPA	-	No Change	3.5 MTPA	No Change
11	Conventional Slab Caster	2X1 Strand 3.68 MTPA	2X2 Slab Casters 5.73 MTPA	No Change	9.41 MTPA	No Change

Sl No.	Unit Name	Plant units& capacities at 5 MTPA stage (A)	Units proposed during 5 MTPA to 10 MTPA Expansion for which EC already accorded (B)	Present proposal during 5 MTPA to 10 MTPA Expansion in (B)	Total units and capacities after the proposal	Remarks
12	Billet Caster	-	1X6 Strands	No Change	1X6 Strands	No Change
13	Plate Mill	1.5 MTPA	-	No Change	1.5 MTPA	No Change
14	Hot Rolling Mill with Shearing and Slitting	-	5.0 MTPA	No Change	5.0 MTPA	No Change
15	Bar Mill	-	1.4 MTPA	No Change	1.4 MTPA	No Change
16	CRM	1 MTPA	1.5 MTPA	No Change	2.5 MTPA	No Change
17	Galvanizing Line	0.6 MTPA	-	No Change	0.6 MTPA	No Change
18	Electrical Steel CRGO Line	0.4 MTPA	-	No Change	0.4 MTPA	No Change
19	Tin Plate Mill	0.4 MTPA	-	No Change	0.4 MTPA	No Change
20	Colour Coating line	0.5 MTPA	-	No Change	0.5 MTPA	No Change
21	Lime/dolo Plant	1800 tpd	3X600 TPD	No Change	3600 TPD	No Change
22	Oxygen Plant	4100 tpd	3500 TPD	No Change	7600 TPD	No Change
23	Captive Power Plant	300 MW	300 MW	No Change	600 MW	No Change
24	Township	-	150 acres township of 7500 dwellings	No Change	150 acres township of 7500 dwellings	No Change

2.4 Pellet Plant – Main Plant Facilities

Pelletisation turns fine grained iron ore (even low grade iron ore) into balls of a certain diameter, which are suitable for blast furnace and direct reduction. Iron ore is crushed and the impurities are removed. The ore mix is moistened and a binding agent is added. The iron-rich ore is mixed with a binding agent to create durable marble sized "green" pellets in rotating drums or on rotary discs. These green pellets are dried and indurated at temperatures of more than 1000 °C. This will take place on a travelling grate. The pellets have excellent physical and metallurgical properties and can be easily transported, due to their high strength and suitability for storage. The pelletisation process involves three steps:

- Raw material preparation
- Forming green pellets
- Pellet hardening

Prior to the formation of pellets, water is added to iron ore fines to adjust the moisture content to approximately 9 % and the ore is mixed with small amounts of binding agents such as bentonite (approximately 0.5 %) and flux such as limestone, lime olivine and dolomite (1–5 %). These give the pellets the proper physical and metallurgical properties needed for further processing. Mixing takes place in continuously operating drum or pan-type mixers of suitable capacity. Pellets are formed in pelletizing discs. The pellets thus formed have low mechanical strength; they are hardened in Travelling Grate coupled with drying and indurate furnace.

It is proposed to install a Pellet Plant capable of producing up to 9.0 MTPA of pellets. The proposed pellet plant shall comprise the following major technological units.

- Day bin
- Wet grinding of iron ore fines
- Thickener & slurry tanks
- Filtration
- Coarse additives (limestone, dolomite, coke, bentonite) ground storage
- Coarse additives storage bins & grinding
- Storage cum mixing
- Balling
- Induration
- Pellet screening
- Product pellet storage bins
- Process gas dedusting system
- Emergency filter cake stock pile
- Belt conveyors, junction houses & inter-connecting galleries

Apart from the above major units which are elaborated in details below, other auxiliary facilities like material handling, water supply system, compressed air system, fuel gas distribution, air-conditioning & ventilation system, plant dedusting system, electrics, instrumentation & automation facilities etc. have also been envisaged. Adequate hoisting & handling facilities have been provided in all the units for ease of maintenance and operation.

a) Day bin unit

The iron ore fines shall be received on one reversible conveyor at top of day bins in this unit. This reversible conveyor will feed to two parallel reversible cum shuttle conveyors envisaged over two bays of day bins. Eight numbers of bins with effective volume 500 m^3 shall be envisaged for storage of iron ore fines.

The proportioned quantity of iron ore fines will be extracted from these bins through weigh feeders onto conveyors for further transportation to wet grinding unit. The flexibility of feeding any ball mills out of three from any iron ore fines bins shall also be envisaged in this unit. GCP dust shall also be received by dust tanker and pneumatically conveyed to dust bins. Total three numbers of GCP dust bins shall be envisaged in three junction houses before wet grinding unit. The required quantity of GCP dust shall be extracted through rotary airlock valve and fed to conveyors leading to wet grinding unit.

b) Wet grinding unit

The receiving conveyor from the day bin building shall feed the raw material to the screens provided before ball mills in wet grinding unit. The screen overflow shall be fed to three numbers ball mills and underflow shall be collected in a slurry tank. The slurry from slurry tank shall be pumped to classifying cyclones having #325 cut point. The overflow from classifying hydro-cyclones shall be collected in thickeners and the underflow shall be fed to the ball mills. Product from ball mills shall be collected into sump from where the slurry is pumped to hydro-cyclones.

Ball mills shall have hydro-cyclones in closed circuit for grinding raw material to 45 micron. The overflow of the hydro-cyclones shall be collected into thickener having approx. 80%, (-) 45 micron size passing. The underflow of the hydro-cyclones shall be reground in the ball mills.

c) Thickener & Slurry tanks

One number concentrate thickener of 55 m diameter shall be envisaged for thickening of Iron ore concentrate slurry received from hydro-cyclones overflow from wet grinding unit. The thickened slurry shall be pumped to slurry storage agitator tanks which shall be pumped to the Filtration unit for getting filter cake for further transportation to mixing unit. The thickener overflow shall be fed to Pump house. This thickener is provided with flocculent system.

d) Filtration

The slurry from the slurry agitator tanks (2 nos.) shall be pumped to the filters for filtration and the filter cake shall be discharged to the cake conveyors. The filter cake from the cake conveyors below each filter shall be collected on a common reversible conveyor which shall either convey the material to the mixing unit or to emergency storage area. The water required for cloth wash and manifold flush water shall be pumped from pump house. The filtrate water shall be collected in filtrate tanks and shall be pumped to thickener to reduce the mineral content in the filtrate water.

Each filter will be equipped with cloth shaking and cloth flushing system for improved cake discharge and reliability. Cloth flushing will be applied after each cycle when the plate pack is open and cake discharge is complete. Flushing water will be collected with swivel plates underneath the plate pack.

The filter cake having moisture content in the tune of 9.5 % collected from filters shall then be transported to storage cum mixing unit.

e) Coarse additive ground storage unit

Coarse additives like limestone, dolomite, coke & bentonite shall be received at one common ground storage unit inside pellet plant #2 by truck. The individual raw additive shall be fed by pay loaders onto one outgoing conveyor through over-ground hoppers & vibro-feeders as per requirement and transported to respective bins in coarse additive storage bins unit.

f) Coarse additives storage bins & grinding

Coarse additives shall be stored in separate bins, two numbers each for limestone, dolomite, coke & bentonite. The effective volume of each bin shall be approx 200 m^3. Limestone & coke and dolomite & coke shall be fed from the storage bins, to two ball mills on time sharing basis and bentonite to one vertical roller mill for grinding, by means of belt weigh feeder & feed hopper. Ball mills shall be complete with mill feed hopper, air slide, damper, cyclone, bag filter, hot gas generator, circulation fan, surge hopper and transport vessel. Roller mill shall be complete with rotary airlock valve, classifier, bag filter, hot gas generator, circulation fan, surge hopper and transport vessel. Ground additives from this unit shall be carried to respective ground material storage bins in storage cum mixing unit by pneumatic conveying.

g) Storage cum mixing unit

Ground ore concentrate (filter cake) shall be received from filtration unit by belt conveyor and fed to four numbers of bins, two of effective volume 780 m^3 and other two of 730 m^3 through one reversible and slewable belt conveyor on top of the bins. Ground bentonite and mix (flux-tone & coke) from additive grinding unit shall be fed pneumatically to respective bins in this unit. Four number of bins, each of effective volume 400 m^3 for mix, two numbers each of effective volume 450 m^3 for bentonite and one bin of effective volume 200 m^3 for ESP dust shall be envisaged. ESP dust shall be pneumatically transported to ESP dust bin from process & plant dedusting ESPs. ESP dust bin shall have twin outlet with rotary weigh feeders.

Belt weigh feeders shall be mounted at outlet of filter cake bins and rotary weigh feeders at outlet of ground additive & ESP dust bins. All additive bins are equipped with bag filters for cleaning the transport air. Materials discharged from these bins shall be transported to two (02) High intensity mixers by belt conveyors for thorough mixing. Belt weigh scale shall be installed on conveyors before the mixer to control the feed rate of raw mix to the mixer.

The HI mixer shall be provided for thorough mixing of raw materials with controlled addition of process water to form green pellets with sufficient mechanical strength to withstand the subsequent transportation, screening and heat treatment process, and

to adjust the chemistry of the pellets to favour the production of mechanically resistant product pellets with a high compression strength and low abrasion indices, and to adjust the chemistry of the product pellets. The moisture content of the raw mix is raised to approximately 9.5%. The mixed material from the mixer shall be transported by series of belt conveyors to balling unit.

h) Balling unit

The production of green pellets is performed in thirteen (twelve operating and one stand-by) closed pelletizing discs circuits. The mixed material received from storage cum mixing unit shall be distributed to mixed material bins, each with storage capacity of 40 m^3, installed directly above each balling disc. All the bins shall be load cell mounted. A horizontal conveyor equipped with pneumatically operated ploughs will distribute the mixed materials into the mixed material bins. Any spillage passing under these ploughs will be discharged at the head end of the conveyor and recirculated through mixed material route or stored in emergency stockpile.

The material discharge from each mixed material bin will be controlled by dosing belt weigher equipped with variable speed drive, thus feeding the required amount of mixed material onto the corresponding pelletizing disc. The dosing belt weigher will discharge mixed material into the disc feeding chute, which are equipped with fluffing device for disintegration of any compacted material as well as for a distribution of the mixed material on the pelletizing disc. The green pellets will be formed in the discs with a diameter of 7.5 m each, with simultaneous and variable addition of water. The inclination of each disc will be variable and optimum setting (approx. 44 to 53 deg.) is to be determined during start-up, according to mixed material properties, desired green pellet diameter and feed-rate. The rotary speed of the disc can also be varied during operation by means of frequency-controlled motor, depending on the pelletizing characteristic of the concentrate mixture. It can be possible to regulate the disc rpm from 5 to 7.5 during operation. The green pellets from the pelletizing discs will be conveyed to a single deck roller screens where undersize (<9 mm) and oversize (>18 mm) green pellets will be crushed in disintegrators installed on belt conveyors for reject pellets. In case of emergency and during startup of a disc, when the green pellets will not have the required properties, the disc discharge can thus be recycled or discharged to an emergency stockpile by conveyors. The green pellet of (9-18) mm from the single deck roller screens will be finally discharged to the green pellet collecting belt conveyor, which is equipped with a reciprocating head. This belt conveyor ensures the smooth handling of the green pellets.

A belt weigher will be installed at the collecting belt conveyor for weighing the total amount of green pellets discharged from the pelletizing discs. This belt weigher is used for mass balancing and serves as a standby signal for the speed control of the induration machine. The head pulley of this conveyor is supported in a reciprocating carriage, which moves the head pulley over the width of the downstream perpendicularly arranged wide belt conveyor. The forward velocity of the carriage with the head pulley is identical to the belt speed and during the backward stroke the green pellets are discharged onto the wide belt conveyor. The wide belt conveyor will discharge the green pellets onto the double deck roller screen. The bi-layer double deck roller screen will split the green pellets into two layers on the indurating machine. The screen sorts pellets with smaller diameter at the bottom of the bed

and the larger pellets at the top. Undersize & oversize green pellets from the bi-layer double deck roller screen will be recycled by belt conveyors back to the green pelletizing area after crushing in disintegrator. The rollers on screen deck shall be chain driven by variable speed drive/ individually driven rollers. A belt weigher will measure the amount of undersize & oversize green pellets.

i) Induration

The traveling grate machine on which the green pellets will be heat treated, indurated and cooled will have a minimum reaction area of 816 m^2 (4 m wide and 204 m long). This travelling grate will consist of an endless chain of pallets, which continuously revolve. One of the process pre-requisites for obtaining a uniform product quality is a uniform bed height. This will be ensured by automatic control of the traveling grate speed as a function of the ultrasonic level measuring devices installed after green pellets are charged to travelling grate. Grate speed control by ultrasonic has significantly reduced the response times and thus improved pellet bed leveling on the indurating machine. Thermal attack on the pallets and grate bars, which would lead to excessive wear, will be avoided by using a hearth and side layer of indurated pellets. Side layer is used for protecting the sidewalls of the pallets. A storage bin for hearth and side layer will be arranged at the feed-end of the travelling grate. A motor-driven discharge gate can adjust the height of the hearth layer on the pallets. The standard height for this application is approx. 80 mm. The three components are fed onto the pallets in the following order: Hearth layer, Side layer, Green pellets.

The hearth and side layer bin is equipped with an emergency chute which permits additional filling of the pallets with hearth layer in case of failure in the green pellet feeding system and thus protecting the pallets and grate bars from over-heating. The required green balls, in the size range of 9 to 16 mm shall be fed to the indurating machine for heat hardening.

Green pellets are then subjected to the different thermal zones during the process of induration on travelling grate machine.

After drying of green pellets in the up-draught and down-draught drying zones, the dried pellets will be preheated to a progressively higher temperature to initiate oxidation and sulphur burning with fuel (coke) present in the green pellets.

The dried pellets will then be fired at approx. 1300^oC to provide the recrystallization and slag bonding which will impart adequate strength to the pellets. An unfired short section designated as 'after firing' allows the heat front to completely penetrate into the bottom of the bed thereby eliminating sudden quenching of pellets and consequent deterioration of pellet properties.

Cooling of indurated pellets shall be accomplished by up-draughting ambient air, supplied by cooling air fans, through the pellet bed. The cooled pellets will leave the indurating machine at 100^oC or less.

j) Pellet screening

In this unit, vibrating screen is installed to separate out certain quantity of fired pellets from the product pellets, which will be recycled as hearth layer to the indurating machine.

Sized pellets are used as hearth layer to avoid clogging of side layer chutes and improve the permeability of the hearth layer and thus reduce pressure drop and energy consumption of the system. Screened hearth and side layer will be transported by belt conveyors to the hearth layer bin at the feed end of the indurating machine. Vibrating feeders determine the portion of on-spec product pellets to be used as hearth layer and is controlled by the level of the hearth and side layer bin. A belt weigher will register the production rate of the pellet plant. A sampler shall be installed in the discharge chute of product conveyor, which will take samples for pellet quality control.

k) Pellet storage bins

Product pellet from pellet screening unit shall be transported to pellet storage bins by belt conveyor. The storage capacity of the unit shall be approx. 11 hours of finished pellet production.

However, one emergency finished pellet ground stock pile near pellet screening unit shall also be envisaged.

The expected mechanical and metallurgical properties of finished pellets are given in Table 2.3 below.

Table 2.3 - Expected mechanical and metallurgical properties of finished pellets

Sl. No.	Item	Value
i)	Size + 9 to 16 mm +16 mm - 9 mm	92 % 5 % max 3 % max
ii)	Porosity	25 % min
iii)	Cold crushing strength	>= 250 kg/pellet
iv)	Tumble index(+6.35 mm)	92 % min.
v)	Abrasion Index (-1 mm)	5 % max.
vi)	JIS swelling index	20 % max.
vii)	JIS reducibility	65 % min.
viii)	Compression strength after reduction	30 kg/p

2.5 Raw Material Requirement

Keeping in view the plant location it was proposed to utilize the waterways for major transportation of raw material to plant site. The existing Dharamtar jetty was intended to handle the additional load for this purpose.

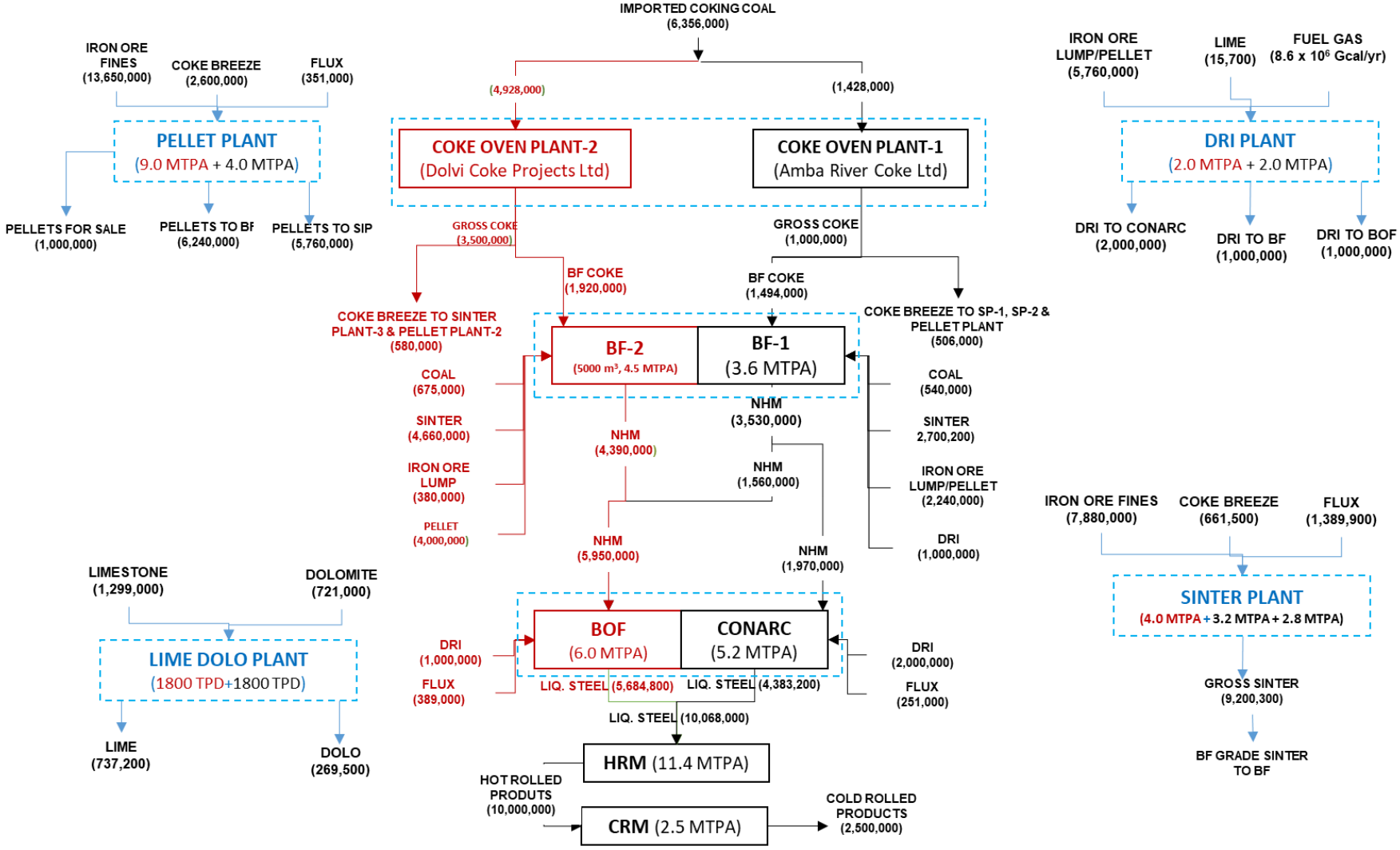
The raw materials requirement before and after the present proposal for sinter and pellet plants are given in Table 2.4.

Table 2.4 – Comparative raw material requirement for sinter and pellet plants

Sl. No.	Description	Unit	Quantity as per EC	Quantities as per present proposal
Pellet Plant				
1	Iron ore fines for Pellet Plant	TPA	4,200,000	8,528,614
2	Limestone for Pellet Plant	TPA	80,000	504,941
3	Dolomite for Pellet Plant	TPA	-	270,000
4	Bentonite for Pellet plant	TPA	28,000	45,000
5	Coke breeze for Pellet Plant	TPA	80,000	94,500
Sinter Plant				
6	Iron ore fines for Sinter Plant	TPA	6,880,000	3,440,000
7	Limestone for sinter Plant	TPA	491,000	245,500
8	Lime for Sinter Plant	TPA	121,000	60,500
9	Dolomite for sinter Plant	TPA	503,000	251,500
10	Coke breeze for sinter plant	TPA	500,000	250,000
11	Mill Scales for sinter Plant	TPA	76,000	38,000

The raw material and product balance for the Integrated Steel Plant at 10.0 MTPA stage after consideration of present proposal is given in Figure 2.1.

Figure 2.1: Raw Material and Product Balance at 10 MTPA stage



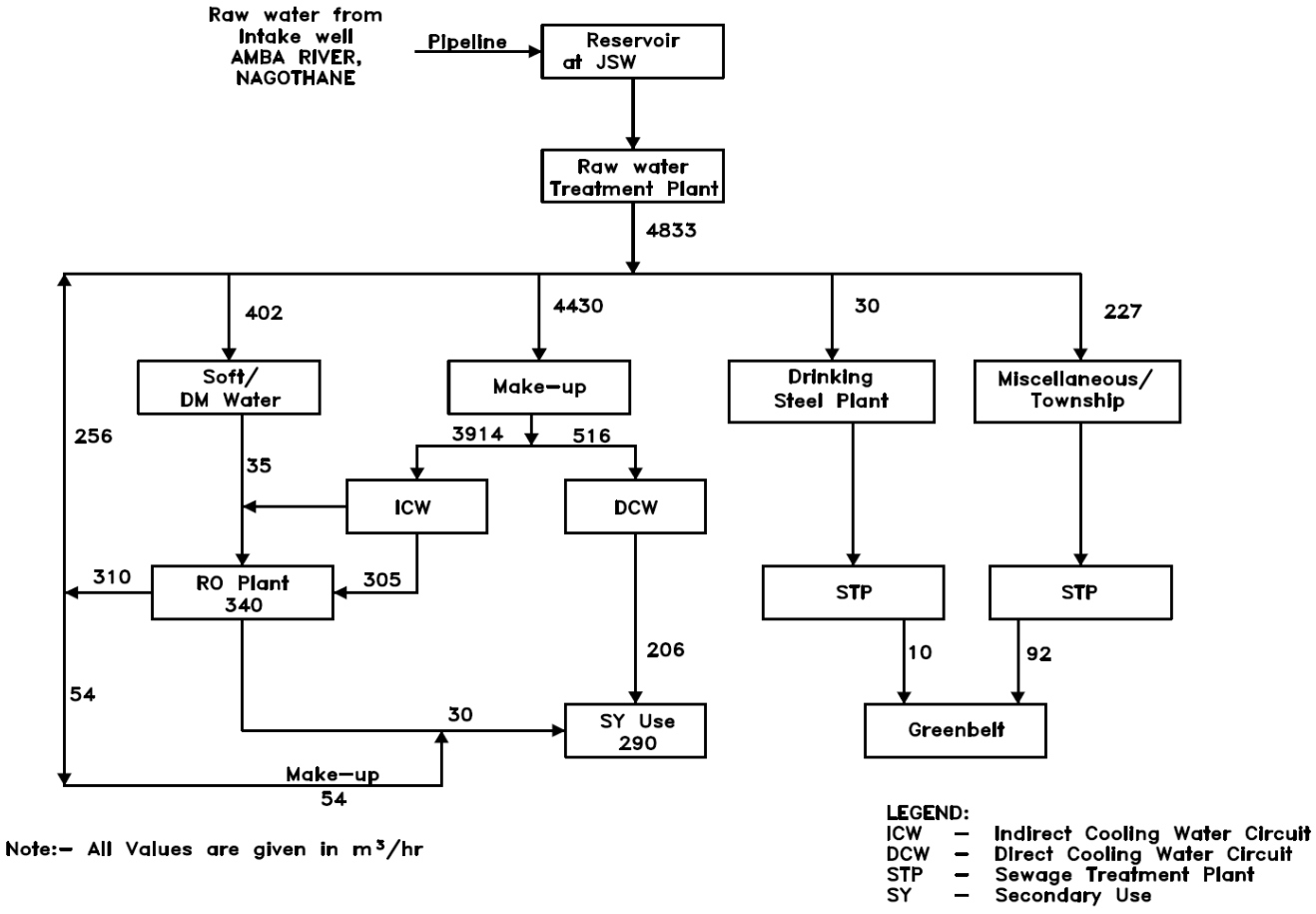
2.6 Water Requirement

Water for the proposed wet grinding & filtration units and pellet plant proper will mostly be required for direct and indirect cooling of plants/machines/equipment with a minor part to be consumed for drinking & sanitation purpose and other direct process & general purpose needs. Individual recirculation system has been envisaged for water system of various plant units to effect extensive recycling and reuse of return water from plant processes after necessary treatment and conditioning.

The total make-up water requirement for the proposed pellet plant is estimated as 205 m^3/h. The same shall be made available from the previously allocated 1409.7 m^3/hr of raw water requirement as required during the EC stage.

The total additional requirement of fresh water for the plant for expansion was estimated to be about 1409.7 m^3/h, which is in addition to existing plant usage of 3423.3 m^3/h at 5 MTPA stage. No additional water shall be sourced for the present proposal. Water balance for the plant is given in Figure 2.2.

Figure 2.2 – Water Balance Diagram



2.7 Land Requirement

For the proposed changes, no additional land shall be required. The revised plant layout is attached as Annexure 1.1.

2.8 Fuel Gas Balance

It is estimated that around 166.3 Mcal/T of fuel gas shall be required for the proposed pellet plant. The same shall be sourced from existing by-product gases of steel plant.

Mixed gas (BF+CO) or coke oven gas shall be used as fuel for the proposed Pellet Plant. The calorific value (CV) of mixed gas (BF+CO) and coke oven gas shall be approximately 1860 kcal/Nm^3 and 4000 kcal/Nm^3 respectively. The estimated quantities of mixed gas or Coke Oven gas are 804.7X10^6 Nm^3/annum and 374.2X10^6 Nm^3/annum respectively.

The fuel gas requirement before and after the present proposal for sinter and pellet plants are given in Table 2.5.

Table 2.5 – Comparative Fuel gas requirement for sinter and pellet plants

Sl. No.	Unit	Gas	As per EC		Sp. Cons. (Mcal/T)	After present proposal		Sp. Cons. (Mcal/T)
			CV (Kcal/Nm^3)	Quantity (Nm^3/hr)		CV (Kcal/Nm^3)	Quantity (Nm^3/hr)	
1	Pellet Plant	CO Gas	4150	15561	201.53	4150	42717	181.35
		BF Gas	850	28631		850	18181	
2	Sinter Plant	CO Gas	4150	844	21.82	4150	2460	22.36
		BF Gas	850	19125		-	-	

No additional fuel shall be required for the proposed changes. The revised fuel balance for plant facilities at 10 MTPA stage are given in Table 2.6.

Table 2.6 – Revised Gas Balance for 5 MTPA to 10 MTPA Expansion

Sl No	NAME OF SHOP/ UNIT	CALORIFIC VALUE	VOLUMETRIC FLOW (NM^3/H)		
		kcal/Nm^3	BF GAS	C.O. GAS	BOF GAS
	GENERATION				
1	BLAST FURNACE - BFGAS	1050	1370069	0.00	0.00
2	COKE OVEN – Coke Oven Gas	4150	0.00	222983	0.00
3	BOF - BOF GAS	1850	0.00	0.00	57750.00
	TOTAL GENERATION		1370069	222983	57750
	CONSUMPTION				
1	Coke Oven #1				
	Battery-A	1050	44212.51	4711.17	-
	Battery-B	1050	44212.51	4711.17	-
	Coke Oven Boiler & NH3	4150	-	3500.00	-
2	Coke Oven #2				
	Battery-A	1050	50107.51	5339.32	-
	Battery-B	1050	50107.51	5339.32	-
	Coke Oven Boiler & NH3	4150	-	2000.00	-
3	Coke Oven #3				
	Battery-A	1050	50107.51	5339.32	-
	Battery-B	1050	50107.51	5339.32	-
	Coke Oven Boiler & NH3	0	-	2000.00	-
4	Sinter #1	4150	-	1539.49	-
5	Sinter #2	4150	-	1140.93	-
6	Sinter # 3	4150	-	2460	-
7	Pellet #1	1850	18209.12	9090.91	-
8	Pellet # 2	1850	36418.24	18181.82	-
9	BF # 1 @10000 TPD	800	225746.27	3420.40	-
10	BF # 2 @12677 TPD	800	318672.00	9204.00	-
11	Billet caster	4150	-	684.56	-
12	SIP	4150	-	25000.00	-
13	TF	4150	-	8000.00	-
14	Bar Mill	1850	18855.86	9413.79	-
15	SMS#2	1850	-	-	12285.01
16	HSM#2	1850	41049.62	20494.04	44415.00
17	Cement Plant with new unit	4150	30000.00	-	-
18	Coal Injection	-	8000.00	1000.00	-
19	LCP (1,2,3 fuel conversion)	1850	13520.27	6750.00	-
20	LCP 4	1850	6760.14	3375.00	-
21	LCP (5-7)@1800 TPD	1850	20280.41	10125.00	-
22	53.5 MW PP	750	180000.00	-	-
23	150 MW PP	750			
Total Consumption			1206367	165700	56700

2.9 Power Requirement

The estimated power requirement of the proposed 9.0 MT Pellet Plant is around 80 MVA (Maximum Demand) with annual energy consumption of 425 GWH. The same shall be tapped from JSW's existing 33 kV switchboard located at 220/33 kV MRS sub-station to 33 kV switchboard located at new 33/6.6 kV Main sub-station (ESS-1) for Pellet Plant, which will be located approximately 3.0 km apart from the MRS.

The power requirement for 5.0 MTPA to 10.0 MTPA expansion is about 400 MW and initially it will be made available by MSEB grid, at 220 kV from MSEB grid sub-station located near the plant site. Once the 5 MTPA plant operation stabilize, the total power requirement is proposed to be supplied from the captive power plant of 55 + 600 MW gas based capacity. Some power would also be available from the top pressure recovery turbine generators of the blast furnace. No additional power shall be required for the proposed changes.

2.10 Air pollution Load

Major source of air pollution in a pellet plant is Induration furnace flue gas and product discharge area fugitive emission. The quantity of PM, SO_2 & NOx which is estimated to be generated from the proposed pellet plant is estimated around 28.9 Kg/hr, 62.6 Kg/hr & 250.6 Kg/hr respectively.

The estimated 25 Lakh m^3 of process flue gas from the unit shall be released into the atmosphere from a stack of height 80 m for proper dispersal of pollutants.

The estimated pollution load from various units of the steel plant for expansion from 5 MTPA to 10 MTPA as estimated for PM, SO_2 & NOx emissions before and after the present proposal is shown in Table 2.7. Comparative pollution loads of all 5 MTPA to 10 MTPA expansion units before and after the present proposal is given in Table 2.8.

Table 2.7 – Comparative pollution loads from sinter and pellet plants before and after the present proposal.

Sl. No.	Unit	Pollution Load (Kg/Hr)		
		PM	SO2	NOx
As per EC				
1	2X4.0 MTPA Sinter Plant	176.4	183.6	146.9
2	1X4.0 MTPA Pellet Plant	83.2	37.4	150.0
Total as per EC		259.6	221.0	296.9
After present Proposal				
1	1X4.0 MTPA Sinter Plant	88.2	91.8	73.4
2	1X9.0 MTPA Pellet Plant	28.9	62.6	250.6
New Total		117.1	154.4	324.0
Difference		-142.5 (-54.9%)	-66.6 (-30.1%)	+27.2 (+9.2%)

Table 2.8 – Comparative pollution loads from all units of 5 MTPA to 10 MTPA expansion before and after the present proposal.

Sl. No.	Unit	Pollution Load (Kg/Hr)		
		PM	SO2	NOx
1	Total as per EC	532.4	264.3	813.0
2	Revised Total	389.9	197.6	840.2
Difference		-142.5 (-26.8%)	-66.6 (-25.2%)	+27.2 (+3.3%)

After the present proposal, the pollution load from the proposed sinter plant shall be reduced and pollution load from the new 9 MTPA pellet plant shall increase. However, high efficiency bag filters/ ESP shall be installed to limit the particulate matter concentration to 10 mg/Nm^3. Therefore, output PM pollution load from the 9 MTPA pellet plant shall be reduced as compared with previously considered Pellet plant of 4 MTPA stage.

Major source of SO_2 pollution load in sinter and pellet plants is coke breeze. After the present proposal, requirement of coke breeze shall be reduced by 235,000 TPA. Therefore, a major decrease in SO_2 pollution load is envisaged.

Thermal NOx is the major pollutant in pellet plant induration process. As the capacity of pellet plant is being increased, an increase in NOx pollution load is also estimated. However, the increase in NOx loads shall be less than the proportional increase in size of the capacity as a result of implementation of energy efficient technologies.

Therefore, after the present proposal, there shall be a decrease in PM and SO_2 pollution load and marginal increase in NOx load. The impacts due to proposed changes in pollution loads on ambient air are predicted in Chapter 4.

2.11 Effluents Generation

Extensive recycling has been adopted in the design of plant water system for the proposed pellet plant. Quality of circulating water will be maintained through dosing of conditioning chemicals for controlling corrosion, scale deposit and microbial growth. Waste water from makeup water treatment plant will be neutralized and recycled in the plant activities. The sludge arising out of different circuits will be disposed of at suitable location.

No additional effluents shall be generated after the present proposal. The plant is designed for complete recirculation of water except during monsoon.

Waste water generated from other units of the 5 MTPA to 10 MTPA expansion of plant will be treated to the desired extent and recycled in the re-circulating system as far as possible, facilitating adequate reuse of water. Backwash water generated from different pressure filters will be treated in a treatment plant having sludge disposal facilities. The treated water will be reused in the direct cooling circuit.

2.12 Solid Waste Generation

The only Solid waste generated in a pellet plant is the dust collected in various air Pollution Control devices. The same shall be utilized as such within the plant itself as raw material. No additional solid wastes shall be generated from the proposed changes.

The shop wise details of solid waste generation at 5 MTPA to 10 MTPA stage are given in Table-2.9.

Table 2.9 – Details of Solid wastes generation at 5 MTPA to 10 MTPA stage.

Sl. No	Solid waste	Generation Quantity (tpa)	Proposed disposal
1	Slag		
a.	Iron Making slag	1600000	Granulated and shall be used for cement manufacture
b.	Steel making slag	1240000	Slag is processed and used in Sinter plant, making internal road surface etc.; balance for filling low lying area
2	Sludge		
a.	SMS Sludge (SMS)	30000	Used in Pellet and Sinter Plants after dewatering
b.	WWTP Sludge (BF)	48000	Used in Pellet and Sinter Plants after dewatering
c.	HSM Sludge	60000	Used in Pellet and Sinter Plants after dewatering
3	Mill scales		
a.	HSM Scale	60000	Used in Sinter plants
4	Dusts		
a.	SMS Fines	165600	Used in Sinter plants
b.	BF Coke Fines	441000	Used in Sinter plants
c.	BF Iron Ore Fines	630000	Used in Sinter plants
d.	Sinter Fines	945000	Used in Sinter plants
e.	BF Scrap	121500	Used in SMS
f.	Dust from BF APC	67260	Used in Sinter plants
g.	Lime & Pulverized Coal	3600	Used in Pellet and Sinter Plants
h.	Lime Stone Fines	180000	Used in Pellet and Sinter Plants
i.	Dust from Pellet DE	20000	Used in Pellet
j.	Tundish Skull	141427	Used in SMS
k.	Ladle Skull	25914	Used in SMS

Maximum utilization of plant generated solid waste shall be ensured as per the guidelines given in CREP. In order to avoid leaching of materials to ground water, all stocks will piled on slag/clay lined surface.

In addition to above, Hazardous waste in the form of spent oil, Coke oven tar sludge and Waste water treatment sludge shall also be generated. Spent oil shall be sold to authorized parties, tar sludge shall be charged into coke ovens and waste water treatment sludge shall be stored in secured landfill site.

2.13 Environmental Pollution Mitigation Measures

The expansion of integrated steel plant from 5 MTPA to 10 MTPA is under progress. Maximum focus towards compliance of environmental norms is being provided since beginning.

The proposed pellet plant of 9 MTPA capacity shall also be provided with adequate measures to limit the emission of pollutants within the stipulations of statutory norms.

a) Air pollution control

The measures to control the air pollution will ensure that the emissions conform to the norms stipulated by the State Pollution Control Board and the Central Pollution Control Board. Moreover, it will be ensured that the ambient air quality in nearby areas conform to the National Ambient Air Quality Standards stipulated by the Central Pollution Control Board. The work zone air quality will conform to the norms stipulated by the Factory Act.

The system proposed for air pollution will provide acceptable environment conditions in the working areas and abate air pollution in the surrounding areas of the pellet plant complex. The technological equipment and processes have been selected with the above objective.

The efficiency of ESPs/ bag filters shall be such that the emission of dust from stack will not be not more than 10 mg/Nm^3. Depending upon the quality of emissions from different sources, suitable air pollution control systems will be provided. The chimney heights will be as per CPCB norms to ensure Ground Level Concentration (GLC) of different pollutants within permissible limits.

In order to meet the statutory ground level concentration limits for SO_2, NOx and other gaseous pollutants, suitable stacks height will be provided for proper dispersion as per CPCB norms. Stacks will be provided with porthole and working platform so that stack monitoring can be done as per norms of statutory authority.

Various dust/ fume extraction system envisaged are indicated in the Table 2.10 given below.

Table 2.10 – Details of various Air Pollution control system for the Proposed 9 MTPA Pellet Plant

Sl. No.	Location / Shop	Air Pollution Control Facility
1	Indurating machine charging & discharging areas, HL bin discharge, screening etc.	Fume extraction system comprising ESP, centrifugal fan and motor, ductwork including suction hoods, duct supports, stack etc.
2	Limestone, dolomite, coke and Bentonite storage bins in additive storage and grinding unit	Dust extraction system comprising pulse jet type bag filter, centrifugal fan and motor, duct work including suction hoods, duct supports, stack etc.
3	Ground mix (limestone + coke, dolomite + coke) and bentonite bins	Dust extraction system comprising pulse jet type bag filter, centrifugal fan and motor, duct work including suction hood, duct supports, stack etc.
4	Hood Exhaust and Wind box exhaust gases	Fume extraction system comprising ESP, centrifugal fan and motor, ductwork including suction hoods, duct supports, stack etc.
5	Junction houses	Dust extraction system comprising pulse jet bag filter, centrifugal fan and motor, duct work including suction hood, duct supports, stack etc.

b) Water Pollution Control

All effort will be made to ensure minimum discharge of polluted water. Whatever water is discharged, it shall conform to the norms specified in schedule-V of Environmental Protection Act, 1986.

The pollutants present in waste water will be reduced to acceptable levels by adoption of the following schemes:

- Re-circulating water in the process whereby discharged volume is minimum.
- Clarifier and sludge pond for removal of suspended solids.
- Neutralisation of acidic water by lime
- Removal of oil and grease from contaminated water by means of oil traps, skimming devices etc

c) Noise Pollution Control

Various measures proposed to reduce noise pollution will include reduction of noise at source, provision of acoustic lagging for the equipment & suction side silencers, vibration isolators, selection of low noise equipment and isolation of noisy equipment from working personnel. In some areas where it is not feasible to bring down the noise level within acceptable limits due to technological process, personnel working in these areas will be provided with noise reduction aid such as ear muffs/ ear plugs and also the duration of exposure of the personnel will be limited as per the norms.

Apart from theses, various mitigation measures are also proposed for other upcoming units for 5 MTPA to 10 MTPA expansion. Same are given below-

a) Air Pollution Control Measures:

- Bag filter based DE system in BF stock house.
- Bag filter based DE system for ground based pushing emission control in Coke Oven battery
- Dry fog type DS system for material handling junction points
- Fume Extraction system for BOF & LF along with gas cleaning plant.
- Dust extraction system in Sinter Plant and Pellet Plant.
- De-dusting System in lime & dolo plant.

b) Water Pollution Control Measures:

- Re-circulating water in the process whereby discharged volume is minimum
- Clarifier and sludge pond for removal of suspended solids in BF
- Neutralization of acidic water by lime dosing
- Removal of oil and grease from the contaminated water by means of oil traps, skimming devices, etc.
- ETP in coke oven plant/by-product plant
- ETP in CRM complex

c) Waste handling & Noise Control Measures:

- Solid waste generated will be reused/sold and rest will be disposed of as per statutory guidelines
- Noise level within the shop will be less than 85 dB (A) at 1 m distance from the source

All the emissions / effluent quality parameters are being kept within the stipulated norms. These are being taken as guaranteed parameters with suppliers for ensuring compliance.

2.14 Project Cost

The Capital Cost of the expansion of steel plant from 5 MTPA to 10 MTPA is estimated at Rs 17,000 Crores. After the present proposal for installation of a bigger pellet plant and reducing sinter production there shall be a minor decrease in overall cost of expansion project.

3.0 EXISTING ENVIRONMENTAL STATUS

In order to comply with the various conditions stipulated in the EC for the existing JSW is regularly monitoring various environmental attributes such as meteorology, ambient air quality, water quality, noise levels, etc. within the complex at locations within 10 Km radius of the plant through MoEFCC approved and NABL accredited third party agency. Also to monitor the effectiveness of the pollution control measures applied to various units of the plant, work zone monitoring is also being conducted on monthly basis.

In addition, continuous online monitors for stack emission has been installed in all process stacks and the data is hooked up to CPCB and MPCB server on real time basis.

3.1 Ambient Air Quality

Continuous Ambient air quality monitoring is being done at 5 locations. Location map of the ambient air monitoring stations is given in Figure 3.1.

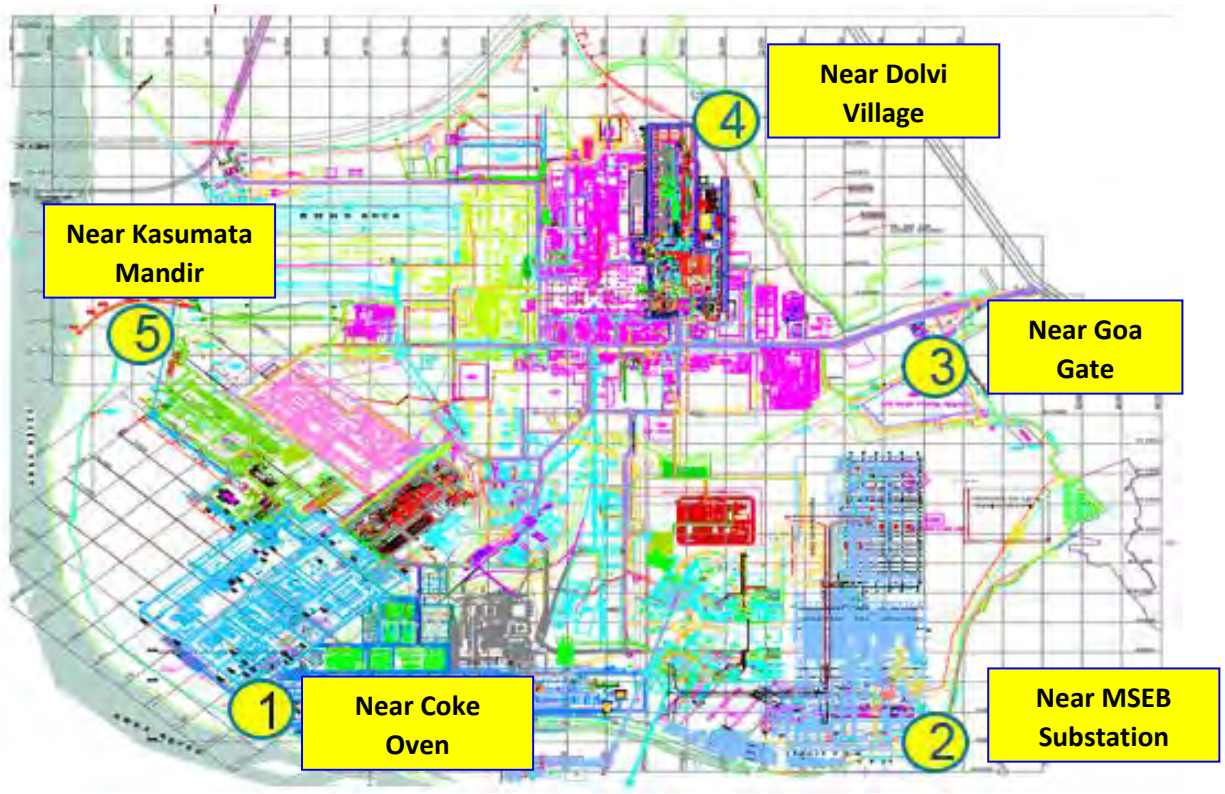
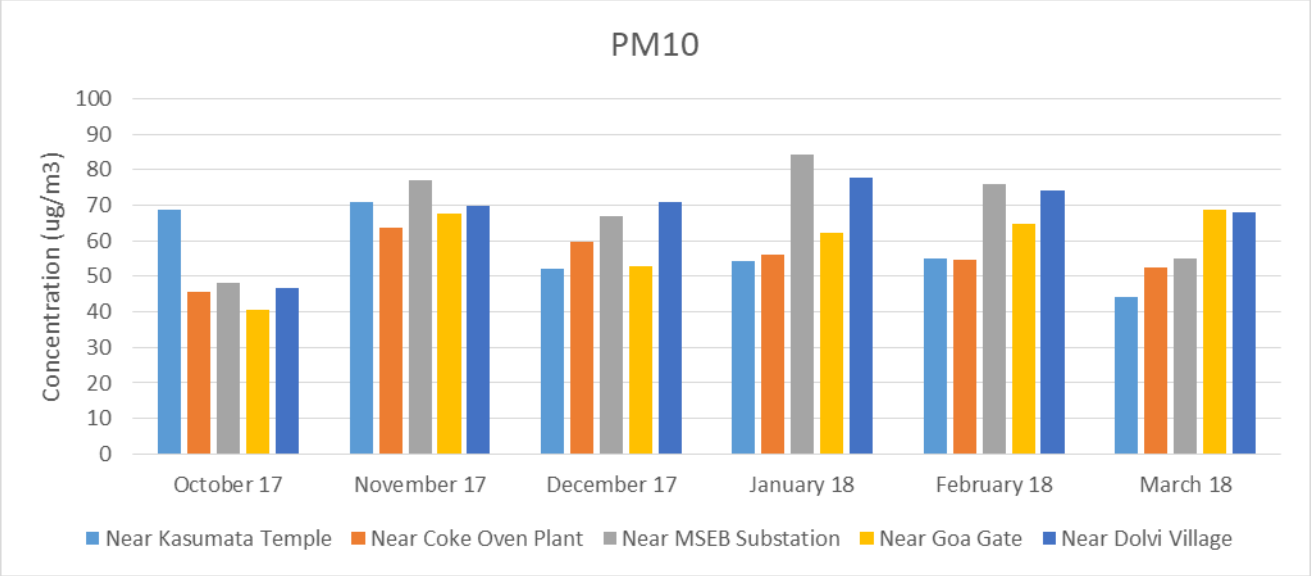
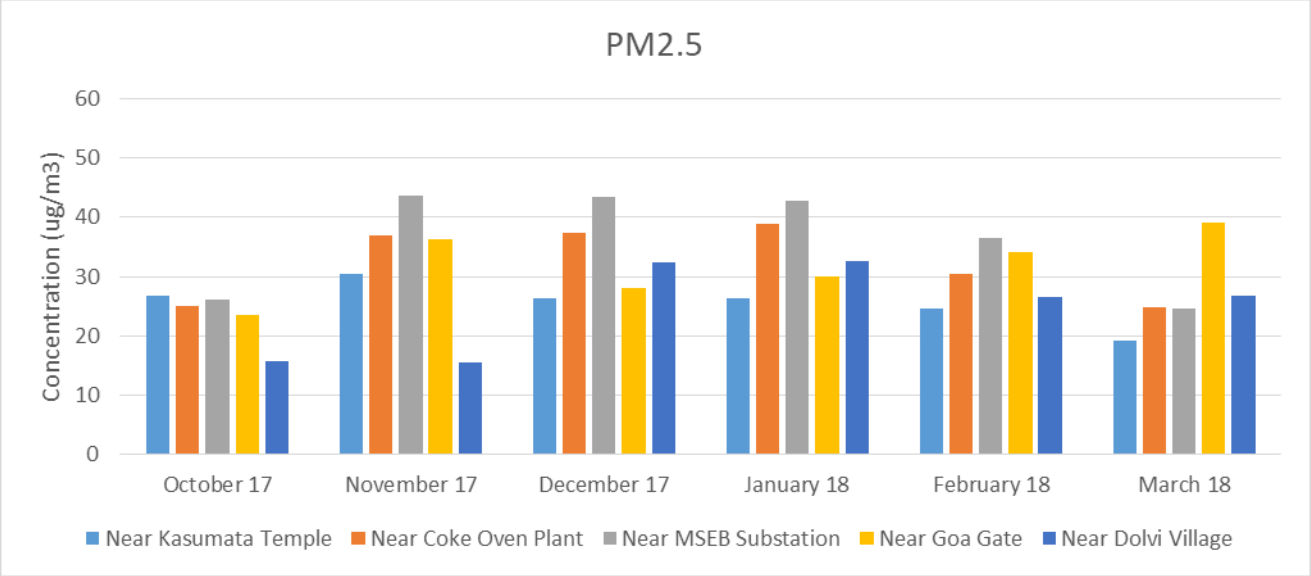


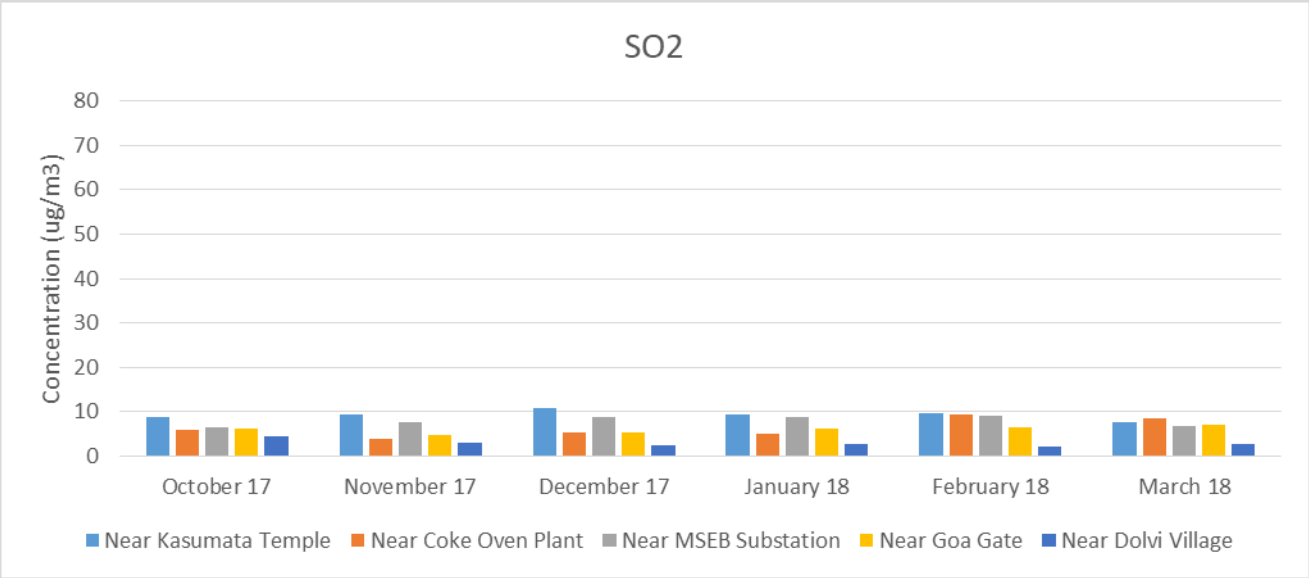
Figure 3.1-Map showing AAQ monitoring locations

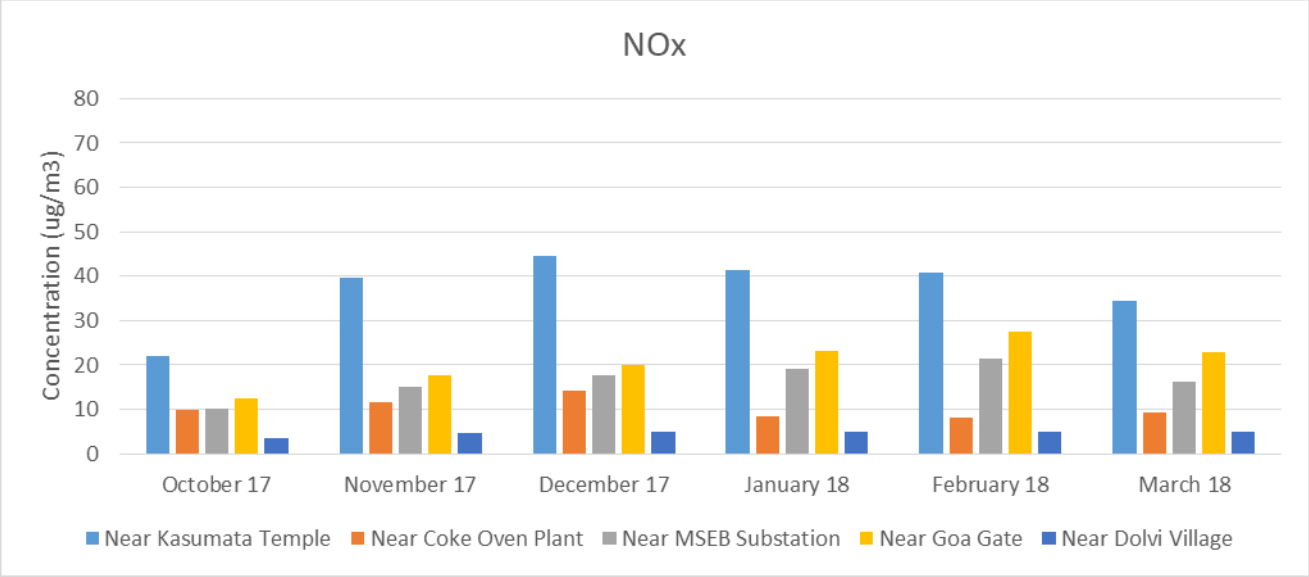
Values of monthly average concentrations of the pollutants monitored at the stations from April 2016 to March 2017 are shown in the Figure 3.2.

Figure 3.2 – Monthly variation of average concentrations of the pollutants





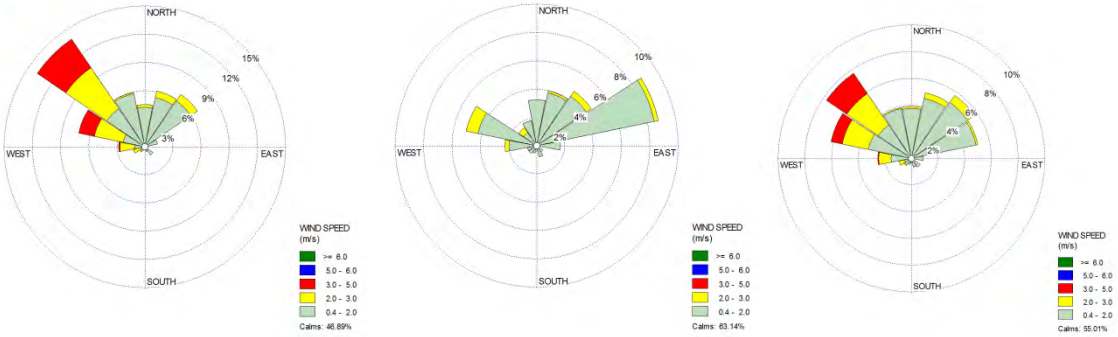




JSWSL is also continuously monitoring the meteorological data at site. Based on the site monitored meteorological parameters, wind roses are prepared for different seasons. Wind roses prepared based on site specific data are shown in Figure 3.3(a-b).

Figure 3.3 - Site specific Wind roses (Summer)

Day Night Overall



3.2 Existing Stack Emissions

All major stacks are provided with continuous emissions monitoring systems (CEMS). The real time data connectivity has been established to SPCB and CPCB servers as per CPCB guidelines. Emissions from all other remaining stacks is also monitored regularly. The present Environmental performance of Existing units are given in Table 3.1.

Table 3.1 – Emissions from major units of Existing plant

Unit	Gas QTY (Nm^3/Hr)	PM Concentration Mg/Nm^3
1) Sponge Iron Plant		
Flue Gas Ejector	744663	5.2
Furnace Dust Collection stack	24195	19.3
Prod. Screen dust collection I	32199	17.6
Prod. Screen dust collection II	24598	15.0
Screen Dust Collector Stack C304	27013	20.8
Product silo dust collection stack	26249	9.8
2) Hot Strip Mill (HSM)		
GCP I	1243829	13.8
GCP II	1038692	18.6
TF I A	74564	13.4
TF I B	61664	14.7
TF II A	61027	11.4
TF II B	59671	11.4
18 tph Boiler	45178	14.9
GCP III	537522	18.6

Unit	Gas QTY (Nm^3/Hr)	PM Concentration Mg/Nm^3
De- dusting System Stack	119601	21.5
3) Blast Furnace		
Stove	726421	17.6
16 tph Boiler	40144	12.2
55 CPP Boiler	719235	9.7
Dedusting system stack I - Stock House I	167302	28.7
Stock House II	166142	27.4
Cast House DE System	1065143	19.3
4) Lime Calcination Plant (LCP)		
Kiln -I	29844	16.3
Kiln -II	29349	20.5
KILN-III	60687	21.5
Lime Stone dedusting system for Kiln I & II	20408	23.4
Lime dedusting System Stack for Kiln I & II	19601	24.2
Lime Stone dedusting system for Kiln III	46788	20.6
Quick Lime & Lime De-Dusting system for kiln III	28364	22.7
5) Sinter Plant I		
Sinter I Main ESP	660724	35.3
Fuel Bag Filter	87835	20.7
Flux ESP	286719	21.2
Proportioning ESP	168333	25.0
Sinter Sizing & Discharge End ESP	583825	41.6
6) Sinter Plant II		
Sinter II (Main ESP)	1132525	21.6
Bag Filter 1 (Flux/Fuel Crusher Building)	292039	19.2
Bag Filter 2 (Flux/Fuel Screen Building)	52884	18.6
Bag Filter 3 (Near Sinter Product Screen Building)	30670	20.1
Bag Filter 4 (Near Sinter Product Crusher & HLQRF)	22050	21.1
Bag Filter 5 (Near	22799	18.0

Unit	Gas QTY (Nm^3/Hr)	PM Concentration Mg/Nm^3
Banker House & JHO8)		
Bag Filter 6 (Banker House)	30582	21.9
Bag Filter 7 (Fuel Storage Bin Crusher Building)	20505	16.9
7) Billet Caster Stack	125828	7.6
8) Bar Mill (Reheating Furnace)	314611	9.5
9) Coke Oven Plant		
COP Main Stack	689787	18.8
COP Boiler Stack	115815	13.6
COP Ground De-dusting Stack	179447	16.6
10) Pellet Plant		
PP Main ESP	1255730	11.3
PP De-dusting system 1 and 2	33458	23.6
PP De-dusting system 3	20682	17.8
PP De-dusting system 4	48333	17.4
PP De-dusting system 5	105678	18.3

3.3 Effluent Quality of Existing plant

No effluents are being discharged outside the plant boundary. Any waste water generated in the plant processes is treated and recycled within the plant itself.

3.4 Solid & Hazardous Wastes Generation

Solid and Hazardous wastes are generated at various units of the Steel Plant. The details of solid and hazardous wastes generation during 2017-18 are given in Table 3.2 and Table 3.3 below.

Table 3.2 – Details of Solid waste generation during 2017-18

Sr. No.	Name of The Plant	Type Of the Hazardous waste	Quantity (TPA)	Mode of Disposal
1	Hot Strip Mill Plant	EAF & LF Slag	913938.1	Used for Internal road making and land reclamation
		Filtration Plant Sludge	4402	Used for Sinter making
2	Sponge Iron	Oxides Fines	53390	Used for Sinter making

	Plant	Process Water Sludge	66087	Used for cement making
3	Blast Furnace	BF Slag	1036076.030	Used for Cement making
		Dust Catcher	34688.84	Used for Sinter making
		W. W. T. P. Sludge	3080	Used for Sinter / Pellet making
		Coke Fines	431514.6	Reused for sinter making
		Oxides Fines	47844.74	Reused for sinter making
4	Sinter Plant – I	Sinter Fines	429477.91	Reused for sinter making
		ESP Dust	1935.57	Reused for sinter making
5	Sinter Plant – II	Sinter Fines	243685	Used for Sinter making
		ESP Dust	951.27	Used for Sinter making
6	Billet Caster & Bar Mill	Scale from Ladle Heating Furnace & Billet Caster	1576.13	Used for Sinter making
		Bar Mill Scale	2335.72	Used for Pellet making
7	Coke Oven Plant (ARCL)	Coke Breeze	9268.5	Used for Sinter making
		Coke & Coal Dust	542.4	Used for Sinter making
8	Pellet Plant	ESP & Bag fillter dust from dedusting system	19803	Reused in pellet plant

Table 3.3 – Details of Hazardous waste generation during 2017-18

Sr. No.	Name of The Plant	Type Of the Hazardous waste	Quantity (Litre/Annum)
1	Hot Strip Mill Plant	Used Oil (Category No. 5.1)	104800
2	Sponge Iron Plant		9000
3	Blast Furnace		15600
4	Sinter Plant I		8600
5	CPP (55 MW)		0
6	1260 TPD Oxygen Plant		0
7	Sinter Plant - II		0
8	Billet Caster & Bar Mill		9000
9	Coke Oven	Decanter Sludge	5 TPA
Total			147000

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS

Expansion of Dolvi Integrated Steel Plant is in advance phases of planning. Construction works of some of the units has already been started. At present, except bar mill, construction work of none of the other units proposed for the expansion plan have been completed. The major impacts due to proposed changes in plant configuration on ambient environment shall be restricted to operation phase only.

The impacts due to proposed changes in overall plant configuration on ambient environment is predicted in the following paragraphs.

4.1 Impacts on Ambient Air Quality

The estimated pollution load for the expansion of integrated steel plant from 5 MTPA to 10 MTPA as per the configuration during EC stage is compared with the estimated pollution load after the proposed changes.

The estimated pollution loads before and after the present proposal are given in Table 4.1 and Table 4.2.

Table 4.1 – Comparative pollution loads from sinter and pellet plants before and after the present proposal.

Sl. No.	Unit	Pollution Load (Kg/Hr)		
		PM	SO2	NOx
As per EC				
1	2X4.0 MTPA Sinter Plant	176.4	183.6	146.9
2	1X4.0 MTPA Pellet Plant	83.2	37.4	150.0
Sub-total as per EC		259.6	221.0	296.9
After present Proposal				
1	1X4.0 MTPA Sinter Plant	88.2	91.8	73.4
2	1X9.0 MTPA Pellet Plant	28.9	62.6	250.6
New Sub-total		117.1	154.4	324.0
Difference		-142.5 (-54.9%)	-66.6 (-30.1%)	+27.2 (+9.2%)

Table 4.2-Estimated pollution Loads before and after the present proposal for 5 MTPA to 10 MTPA Expansion

Sl. No.	Phase	Pollution Load(Kg/hr)		
		PM	SO_2	NOx
1	Pollution loads due to proposed expansion from 5 MTPA to 10 MTPA as per EC	532.4	264.3	813.0
2	Revised Pollution loads due to proposed expansion from 5 MTPA to 10 MTPA after present proposal	389.9	197.6	840.2
Difference(1-2)		-142.5 (-26.8%)	-66.6 (-25.2%)	+27.2 (+3.3%)

From the above table it is seen that a slight decrease in the total PM and SO_2 pollution loads is anticipated as a result of change in selection of pelletization in place of sintering. However, a slight increase in pollution load with respect to NOx emission is also anticipated. However, in order to predict the impacts of the proposed changes in the ambient environment, Ground Level Concentrations (GLCs) are also predicted at various ambient air quality monitoring stations to determine the cumulative impact.

Prediction of Impacts

After proposed project, a slight variation in pollution loads is estimated. However, to study the ground level concentrations in future scenario and to predict the impact on the ambient air quality due to the revised pollution loads, following methodology has been adopted.

For assessment of expected air emissions after the proposed project, the basic assumption followed are:

- The air pollution load emitted from the existing stacks of units presently installed in JSW Steel plant complex is being reflected in the ambient air quality as monitored during continuous/regular monitoring done around JSW Steel Plant complex.

- For estimating GLCs from proposed units of the expansion phase which are not proposed for any modification, emission values as estimated during the EC stage shall be used. This shall also include emissions from one out of the two similar 4 MTPA sinter plants proposed during the EC stage.

- For pellet plant, estimated emission values from the 9 MTPA unit in place of earlier proposed 4 MTPA unit shall be used for prediction of GLCs.

- The estimated GLC values from the above two predictions shall be added to estimate the overall contribution of proposed expansion plan in ambient air.

- For estimating GLCs from other upcoming units in the study area (Coke oven of Dolvi Coke Projects Limited and Slag & Clinker grinding unit of JSW Cements Limited), Stack emission details as provided in respective EC letters/ EIA report shall be used.

- For obtaining the cumulative impact of the proposed project, all the estimated GLCs shall be superimposed over the background AAQ concentration at each individual station.

Atmospheric dispersion modelling using estimated release rates has been conducted to provide information on the location and levels of GLCs on the plain areas that may be expected as the result of the proposed project. Hourly meteorological data was generated for a period of three (3) months (March 17 to May 17). This data is used to examine the effects of wind speed, direction and stability on projected concentrations of contaminants in air and on nearby areas.

Estimated stack emissions from the expansion units of proposed 5 MTPA to 10 MTPA expansion as per previous EC are shown in Table 4.3. Air quality contamination emissions have been calculated by release mechanism and production activities which will take place in future. The estimated values of stack emissions from the proposed units after the present proposed changes are given in Table 4.4.

Table 4.3. Estimated values of Stack Emissions for upcoming units in 5 MTPA to 10 MTPA expansion as given in earlier EC

SL no.	Unit	Stack	Height (m)	Dia (m)	Temp (K)	Flow Rate (Nm^3/h)	Anticipated Emissions (g/sec)		
							PM	SO_2	NOx
1.	SP3-1	Machine	130	6	160	1,224,000	17	25.5	20.4
2.		SDD	65	4	40	540,000	7.5	0	0
3.	SP3-2	Machine	130	6	160	1,224,000	17	25.5	20.4
4.		SDD	65	4	40	540,000	7.5	0	0
5.	Pellet 2	Process	100	6.5	115	1,500,000	20.8	10.4	41.67
6.		SDD	30	2	45	166,700	2.3	0	0
7.	Bar Mill	RH Furnace	60	2	318	75,000	0.4	0.42	1.04
8.	LCP 5	Process	45	2	130	120,000	1.7	0.67	1.67
9.	LCP 6	Process	45	2	130	120,000	1.7	0.67	1.67
10.	LCP 7	Process	45	2	130	120,000	1.7	0.67	1.67
11.	DRI 2	Flue gas ejector	40	4.5	180	1,228,034	0.7	0	95.9
12.		Reduction Furnace	30	0.9	65	21,562	0.3	0	0.13
13.		Product Silo Dust Collector	30	0.9	55	26,411	0.4	0	0
14.	BF2	Stove	60	4.8	200	500,000	2.8	2.08	6.9
15.		Cast house East	40	5.5	40	1,500,000	20.8	0	0
16.		Stock house	40	4	40	600,000	2.3	0	0
17.	SMS2	FE System	40	5.5	60	1,500,000	20.8	0	0
18.	HSM2	RH Furnace	100	4.2	293	226,000	1.3	1.26	3.14
19.	CRM 2	Process	30	1.2	45	23,000	0.1	0	0
20.	CPP2	Flue Gas	85	5.5	150	1,500,000	20.8	6.25	31.25

Table 4.4. Estimated values of stack emissions from the proposed units after the present proposed changes in plant configuration

SL no.	Unit	Stack	Height (m)	Dia (m)	Temp (K)	Flow Rate (Nm^3/h)	Anticipated Emissions (g/sec)		
							PM	SO_2	NOx
1.	SP3-1	Machine	130	6	160	1,224,000	17	25.5	20.4
2.		SDD	65	4	40	540,000	7.5	0	0
3.	Bar Mill	RH Furnace	60	2	318	75,000	0.4	0.42	1.04
4.	LCP 5	Process	45	2	130	120,000	1.7	0.67	1.67
5.	LCP 6	Process	45	2	130	120,000	1.7	0.67	1.67
6.	LCP 7	Process	45	2	130	120,000	1.7	0.67	1.67
7.	DRI 2	Flue gas ejector	40	4.5	180	1,228,034	0.7	0	95.9
8.		Reduction Furnace	30	0.9	65	21,562	0.3	0	0.13
9.		Product Silo Dust Collector	30	0.9	55	26,411	0.4	0	0
10.	BF2	Stove	60	4.8	200	500,000	2.8	2.08	6.9
11.		Cast house East	40	5.5	40	1,500,000	20.8	0	0
12.		Stock house	40	4	40	600,000	2.3	0	0
13.	SMS2	FE System	40	5.5	60	1,500,000	20.8	0	0
14.	HSM2	RH Furnace	100	4.2	293	226,000	1.3	1.26	3.14
15.	CRM 2	Process	30	1.2	45	23,000	0.1	0	0
16.	CPP2	Flue Gas	85	5.5	150	1,500,000	20.8	6.25	31.25
17.	Pellet 2 New	Process	80	9.7	150	2,506,140	7.0	17.4	69.6
18.		SDD	50	2.6	70	210,000	0.6	0.0	0.0
19.		Pellet storage SDD	45	2.2	60	170,000	0.5	0.0	0.0

The US Environmental Protection Agency's (EPA's) AERMOD computer code is used to estimate atmospheric dispersion and concentrations of the released emissions in the immediate vicinity of the proposed sources. The modelling is conducted to be inclusive of the weather conditions that are possible and representative of the expected sources.

Both airborne and surface concentrations are modelled with AERMOD. Hourly derived air concentrations (DAC) are modelled for an array of receptors covering the sources and surrounding areas. Peak values of time-integrated air concentrations at these major receptors points are derived from these hourly values, with modelled results reported as total incremental air concentrations in DAC-hours occurring over the selected time period. Total pollutants concentration over the plain areas are evaluated with AERMOD using the same array of receptors, with results reported as microgram per m3.

The impact has been predicted over a 20 km X 20 km area with the location of the existing BF1 is taken as the center. GLCs have been calculated at every 500 m grid

point. Ground Level Concentrations Modelling has been carried out considering plain terrain as the residing population is concentrated in the plain areas.

As indicated above, in order to obtain the impact due to proposed project, seasonal average values of pollutant concentrations recorded at different AAQ stations in the study area are added to the predicted net GLC at the particular AAQ station. The net GLCs are obtained from GLCs predicted due to proposed changes. The predicted GLC values have been provided in Table 4.5.

Table 4.5- Predicted GLC values before and after the present proposal
(GLC values in $\mu g/m^3$ (24hrs. avgs))

PM

Station ID	Description	Predicted GLCs as per EC	GLCs after present proposal	Difference
AAQ1	Near Kasumata Temple	8.33	6.67	-1.67
AAQ2	Near Coke Oven Plant	14.46	10.82	-3.64
AAQ3	Near MSEB Substation	7.92	6.30	-1.62
AAQ4	Near Goa Gate	5.74	4.56	-1.18
AAQ5	Near Dolvi Village	5.93	4.83	-1.10

SO_2

Station ID	Description	Predicted GLCs as per EC	GLCs after present proposal	Difference
AAQ1	Near Kasumata Temple	2.67	1.93	-0.74
AAQ2	Near Coke Oven Plant	3.02	2.07	-0.96
AAQ3	Near MSEB Substation	2.37	1.70	-0.67
AAQ4	Near Goa Gate	1.93	1.46	-0.47
AAQ5	Near Dolvi Village	2.05	1.55	-0.50

NOx

Station ID	Description	Predicted GLCs as per EC	GLCs after present proposal	Difference
AAQ1	Near Kasumata Temple	9.36	8.97	-0.39
AAQ2	Near Coke Oven Plant	9.25	8.25	-1.00
AAQ3	Near MSEB Substation	8.40	8.01	-0.39
AAQ4	Near Goa Gate	7.65	7.67	0.02
AAQ5	Near Dolvi Village	7.95	7.95	0.00

As seen in the above table, the proposed changes in plant configuration will result in slight decrease in the AAQ concentration of PM_{10} and SO_2. However, marginal increase in GLC values with respect to NOx is also anticipated.

The isopleths of PM, SO_2 & NOx are shown in Figure 4.1.

Figure 4.1 (a) – Isopleths of PM

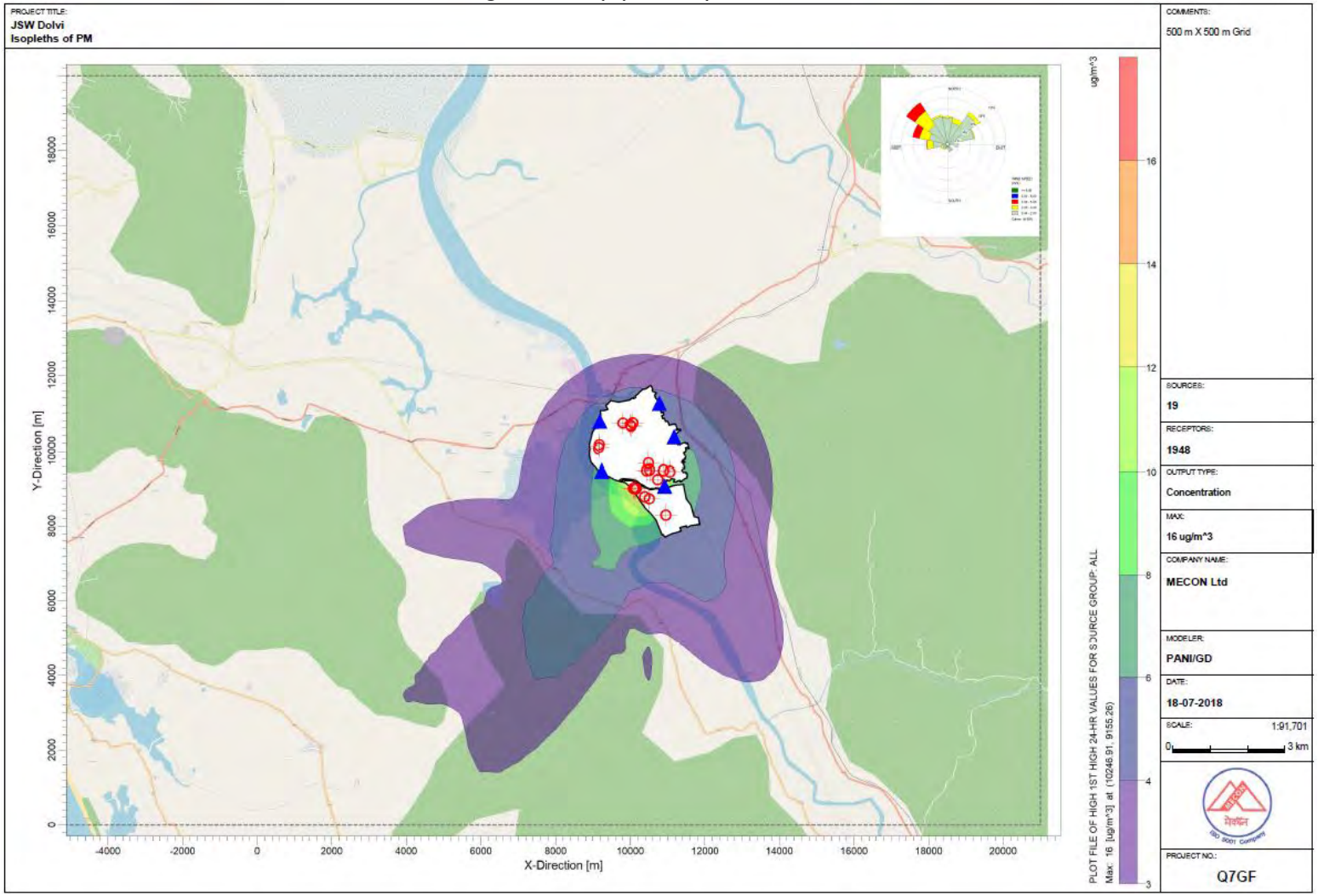


Figure 4.1 (b) – Isopleths of SO_2

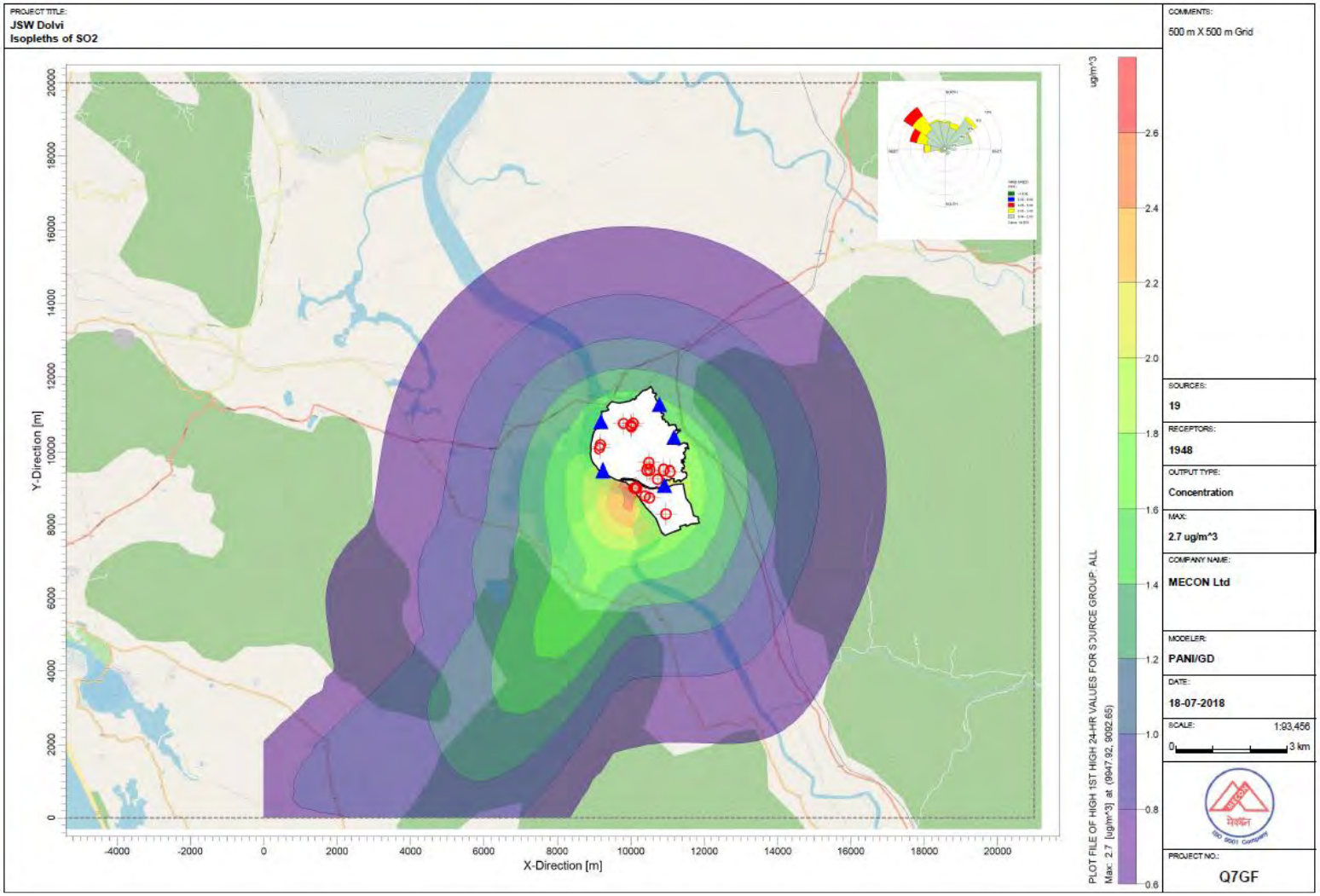
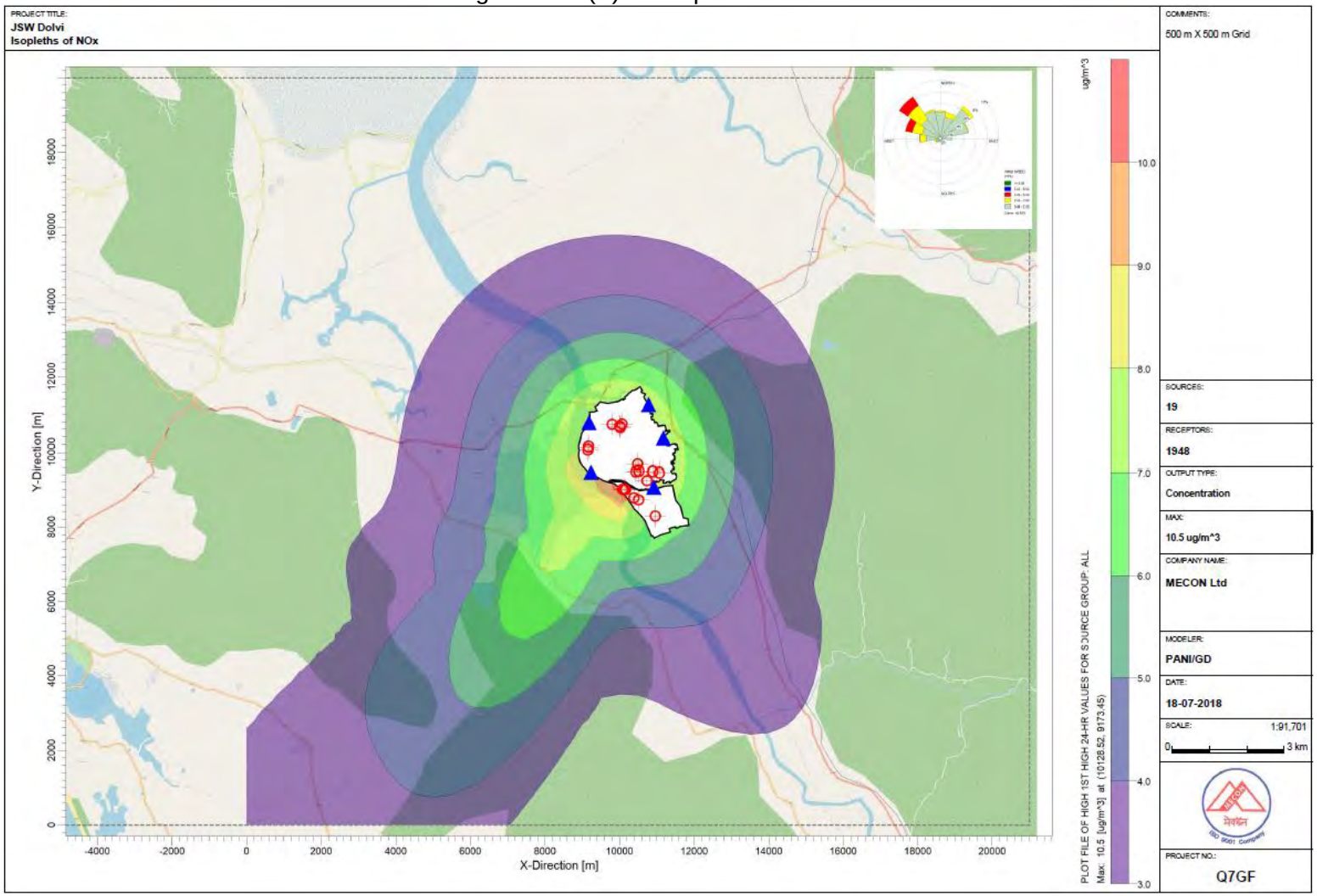


Figure 4.1 (c) – Isopleths of NOx



In order to identify the cumulative impact of the proposed project as well as other expansion and new projects in the study area, the GLCs from all other upcoming projects are also estimated on the AAQ Stations and the resultant GLCs from these future projects are also added to the GLC for expansion units as given in Table 4.5. The cumulative values are shown in Table 4.6.

Table 4.6 – Cumulative AAQ concentration at monitoring station after proposed changes of expansion units
(GLC values in µg/m^3 (24hrs. avgs))

PM

Station ID	Description	Background AAQ	GLCs due to expansion units	GLCs due to other projects in study area	Total
AAQ1	Near Kasumata Temple	57.60	6.67	0.52	64.79
AAQ2	Near Coke Oven Plant	55.30	10.82	0.58	66.70
AAQ3	Near MSEB Substation	67.70	6.30	0.40	74.40
AAQ4	Near Goa Gate	59.40	4.56	0.33	64.29
AAQ5	Near Dolvi Village	67.80	4.83	0.40	73.03

SO_2

Station ID	Description	Background AAQ	GLCs due to expansion units	GLCs due to other projects in study area	Total
AAQ1	Near Kasumata Temple	9.30	1.93	1.76	12.99
AAQ2	Near Coke Oven Plant	6.30	2.07	1.54	9.91
AAQ3	Near MSEB Substation	7.90	1.70	1.23	10.83
AAQ4	Near Goa Gate	6.00	1.46	1.03	8.49
AAQ5	Near Dolvi Village	3.00	1.55	1.37	5.92

NOx

Station ID	Description	Background AAQ	GLCs due to expansion units	GLCs due to other projects in study area	Total
AAQ1	Near Kasumata Temple	37.10	8.97	2.65	48.72
AAQ2	Near Coke Oven Plant	10.30	8.25	2.31	20.86
AAQ3	Near MSEB Substation	16.50	8.01	1.85	26.36
AAQ4	Near Goa Gate	20.60	7.67	1.55	29.82
AAQ5	Near Dolvi Village	4.70	7.95	2.06	14.71

4.2 Impacts on Water Environment

For the proposed 9 MTPA pellet plant, 205 m^3/hr of raw water shall be required. Same shall be made available from existing allocation of 1409.7 m^3/hr for the proposed expansion of steel plant from 5 MTPA to 10 MTPA. Therefore, no additional fresh water shall be required to be drawn from outside.

Moreover, as specified in the previous EC, Zero liquid discharge concept shall be followed.

Therefore, no impacts on surface or ground water quality are expected.

4.3 Impacts on Land

No solid waste shall be generated from the 9 MTPA pellet plant. The only waste in the form of flue dust shall be collected and recycled in the plant process.

Therefore, no additional impacts on land environment have been estimated due to proposed changes in plant configuration.

5.0 COMPLIANCE OF EXISTING EC CONDITIONS

Compliance status of EC conditions as provided by JSW in the recent 6 monthly compliance report are given in Table 5.1 below.

Table 5.1 – Compliance to EC conditions for 5 MTPA to 10 MTPA Expansion

Sl No	EC Condition	Compliance Status
Specific Conditions		
1	The project proponent should install 24x7 air and water monitoring devices to monitor air emission and effluent discharge, as provided by CPCB and submit report to Ministry and its Regional Office.	Noted & will be complied. On Line Continuous Monitoring systems have been installed in the existing facilities as per CPCB Guidelines and shall be extended to 5 to 10 MTPA expansion units.
2	The PP should ensure treatment of effluent particularly from Blast Furnace (BF) and Coke Oven plant. The plant should be designed to meet the cyanide standards stipulated by MoEF&CC under EPA Act 1986.	Noted & will be complied. ETP has been provided to the existing Blast Furnace (BF) and Coke Oven plant and are designed to meet the norms. Similarly ETP will be designed to meet the norms both for BF and Coke Oven plant in the expansion project.
3	The commitment made by the PP for plantation of the green belt to the tune of 655 acres should be expedited. Three rows of green belt, 12-15 meters wide, all along the periphery of the plant should be planted.	The expansion of the steel plant from 5 to 10 MTPA is in contiguous to the 3 to 5 MTPA projects. Accordingly, 33% green belt shall be completed in and outside premises as recommended by the EAC, MoEFCC in the next 5 years once the expansion projects are completed.
4	The CSR plan as submitted by the PP in the area of health care, rural infrastructure development, education, sports and cultural activity, Swachh Bharat Abhiyan with respect to the earlier projects and the ongoing project at Dolvi site are very slow in implementation. The CSR activities should be implemented expeditiously and simultaneously with the implementation of the project, and annual report on CSR activity should be submitted to the Ministry.	Noted and will be complied
5	At least 5 % of the total cost of the project should be earmarked towards the Enterprise Social Commitment (ESC) based on local needs. The proponent should prepare a	CSR activities in various sectors are being done in the surrounding villages and a time bound action plan for various

Sl No	EC Condition	Compliance Status
	detailed CSR Plan for every next 5 years for the existing-cum-expansion project, which includes village-wise, sector- wise (Health, Education, Sanitation, Health, Skill Development and infrastructure requirements such as strengthening of village roads, avenue plantation, etc) activities in consultation with the local communities and administration. The CSR Plan will include the amount of 2% retain annual profits as provided for in Clause 135 of the Companies Act, 2013 which provides for 2% of the average net profits of previous 3 years towards CSR activities for life of the project. A separate budget head should be created and the annual capital and revenue expenditure on various activities of the Plan should be submitted as part of the Compliance Report to RO, at Bhopal. The details of the CSR Plan should also be uploaded on the company website and should also be provided in the Annual Report of the company.	CSR activities have been submitted to MoEF&CC as per EAC recommendation of 2.5% of project cost.
6	No development should be done on the creek-ward side of the land. Land area between HTL to 100 mts or width of the creek, whichever is less, on the landward side should be kept free from any type of development.	Development of plant is beyond 100 mtrs from HTL & kept free. Survey was carried out by IRS, Chennai.
7	Full utilization of slag both BF and SMS should be implemented. The details should be submitted along with 6 monthly compliance reports.	Noted & will be complied once the projects are completed
8	No waste water will be discharged outside the plant boundary during normal operation. In case it become necessary to discharge effluent meeting norms fit to the marine environment, permission of the relevant authority should be obtained.	Noted & will be complied
9	No untreated effluent should be reused for any process.	Noted & will be complied
10	Measures should be taken to reduce PM levels in the ambient air. Stack of adequate height & diameter with continuous stack monitoring facilities for all the stacks should be provided and sufficient air pollution control devices viz. Electrostatic precipitator (ESP), bag house, bag filters etc. should be provided to keep the emission levels below 50mg/Nm3 and installing energy efficient technologies in the	Noted & will be complied

Sl No	EC Condition	Compliance Status
	Plant	
11	On-line ambient air quality monitoring and continuous stack monitoring facilities for all the stacks should be provided and sufficient air pollution control devices. Gaseous emission levels including secondary fugitive emissions from all the sources should be controlled within the latest permissible limits issued by the Ministry vide G.S.R.414(E) dated 30th May, 2008 and regularly monitored. Guidelines / Code of Practice issued by the CPCB should be followed.	Noted & will be complied 5 Nos. online Ambient Air Quality Monitoring Stations have been installed in consultation with MPCB & the data connected to MPCB & CPCB Website.
12	Dust suppression system and bag filters should be installed to control the fugitive dust emissions at conveyor and transfer points, product handling, loading and unloading points.	Noted & will be complied
13	Water consumption should not exceed as per the CREP standard prescribed for the steel plants. Additional water, if any, required for the plant project operations. Should be met form rainwater stored in rainwater harvesting structures.	Noted & will be complied
14	Rainwater harvesting scheme should be prepared so that the rainwater can be collected, re-used and may be used for ground water recharge. The concrete drains should be de-silted and regular supervision of the areas should be carried out so that blocking of drains may be avoided for quick discharge of rainwater. Efforts should further be made to use maximum water from the rain water harvesting sources. If needed, capacity of the reservoir should be enhanced to meet the maximum water requirement.	Noted & will be complied Rain Water Harvesting system has been implemented in the existing plant and shall be extended to the expansion project
15	All the effluents should be treated and reused for dust suppression/green belt development. No effluent should be discharged and 'zero' discharge should be adopted.	Noted & will be complied
16	Full utilization of fly ash should be ensured as per Fly Ash Notification, 1999 and subsequent amendment in 2003 and 2010. All the fly ash should be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding should be submitted to the Ministry's Regional Office at Bhopal.	The Captive Power plant for the existing and the expansion project are gas based. Hence Fly Ash is not generated in the process. Therefore Fly Ash utilization is not applicable.

Sl No	EC Condition	Compliance Status
17	Hazardous materials required during construction phase and in plant operations should be stored properly as per the regulations and reused/recycled as per the E(P)A Rules.	Noted & will be complied
18	Vehicles and construction machinery are properly maintained to minimize the exhaust emission as well as noise generation to meet prescribed standards.	Noted
19	Risk and Disaster Management Plan along with the mitigation measures should be prepared and implemented.	Risk & Disaster Management plan has been submitted to MoEF&CC, New Delhi
20	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel Plants should be implemented.	Noted & will be complied
21	All the commitments made to the public during public hearing/public consultation should be satisfactorily implemented and adequate budget provision should be made accordingly.	Noted & will be complied
22	All the permanent workers should be covered under ESI Scheme. The company should hive the provision for treatment of its workers at the local Nursing Homes & Hospitals in case of emergency. Annual Medical Check-up on some medical parameters like Blood test, Chest X-Ray, Eye test, Audiometry, Spirometry etc. should be conducted amongst the employees of the Company.	Noted & will be complied as per earlier practice As per the Factories Act, regular health checkups done for workers and employees & records are maintained on regular basis
	General Conditions	
1	The project authorities must strictly adhere to the stipulations made by the Maharashtra Pollution Control Board and the State Government.	Regularly following the guidelines given by Maharashtra Pollution Control Board (MPCB) and State Government
2	No further expansion or modifications in the plant should be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	Noted and is being complied
3	At least four ambient air quality monitoring stations should be established in the downward direction as well as where maximum ground level concentration of PM10, PM2.5, S02 and NOx are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission should be regularly submitted to this Ministry including	Already 5 Nos. online Ambient Air Quality Monitoring Station installed with consultation of SPSB & data connected to MPCB & CPCB Website.

Sl No	EC Condition	Compliance Status
	its Regional Office at Nagpur and the SPCB/CPCB once in six months	
4	Industrial wastewater should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 313' December, 1993 or as amended from time to time. The treated wastewater should be utilized for plantation purpose.	Noted & will be complied
5	The overall noise levels in and around the plant area should be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (night time).	Noted and is being complied
6	Occupational health surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	As per the Factories Act, regular health checkups done for workers and employees & records are maintained on regular basis
7	The company should develop rain water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.	Noted & will be complied Rain Water Harvesting system has been implemented in the existing plant and shall be extended to the expans1on project
8	The project proponent should also comply with all the environmental protection measures and safeguards recommended in the EIA/EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply and health care etc.	Noted & will be complied
9	Requisite funds should be earmarked towards capital cost and recurring cost/annum for environment pollution control measures to implement the conditions stipulated by the Ministry of Environment, Forests and Climate Change (MoEF&CC) as well as the State Government. An implementation schedule for implementing all the conditions stipulated herein should be submitted to the Regional Office of the Ministry at Nagpur. The funds so	Noted & will be complied

Sl No	EC Condition	Compliance Status
	provided should not be diverted for any other purpose.	
10	A copy of clearance letter should be sent by the proponent to concerned Panchayat, ZilaParishad/Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter should also be put on the web site of the company by the proponent.	Complied
11	The project proponent should upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and should update the same periodically. It should simultaneously be sent to the Regional Office of the MOEFCC at Nagpur. The respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; PM10, S02, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects should be monitored and displayed at a convenient location near the main gate of the company in the public domain.	Being complied
12	The project proponent should also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEFCC, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry at Nagpur / CPCB / SPCB should monitor the stipulated conditions.	Being complied
13	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, should also be put on the website of the company along with the status of compliance of environmental conditions and should also be sent to the respective Regional Office of the MOEFCC at Nagpur by e-mail.	Being complied

Sl No	EC Condition	Compliance Status
14	The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of Environment, Forests and Climate Change (MoEF&CC) at http:/envfor.nic.in. This should be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one should be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office at Nagpur.	Complied Published in newspaper as per guidelines namely in Local newspaper Dainik Krushiwal, Raigad Times, Ramprahar dated August 30, 2015 and English newspaper Indian Express dated September 01, 2015.
15	Project authorities should inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	Noted & will be complied time to time.

6.0 CONCLUSION

The assessment of environmental impact of proposed changes shows;

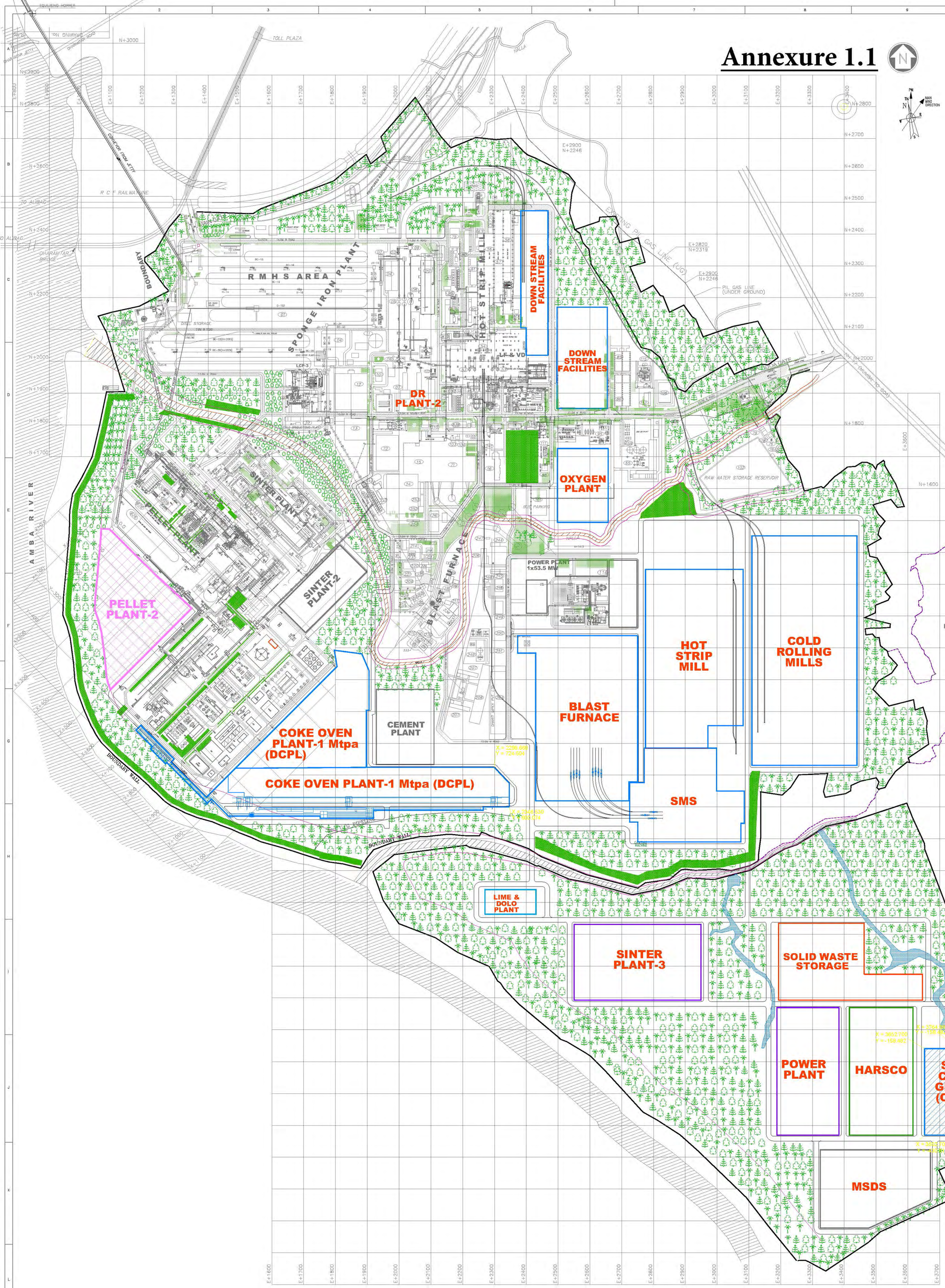
- No increase of pollution emissions in respect of PM, SO_2 & marginal increase in NOx
- No impact on fresh water consumption.
- No impact on Land environment.
- No additional requirement of land, water for the project.

After the proposed changes in the plant configuration and implementation of pollution control equipment and new technologies, there will be decrease of PM, SO_2 pollution loads when compared with pollution loads due to earlier configuration on the ambient environment.

JSW Steel Ltd is regularly submitting the 6-monthly compliance report in MSPCB. The Monitoring Report of regional Office of MoEFCC, Nagpur dated 04/10/2017 is attached as Annexure 6.1.

ANNEXURES

Annexure 1.1



BLAST FURNACE PROJECT– I.M.I.L.

201. RAW MATERIALS STOCKYARD & RAW MIX YARD
202. SINTER PLANT
203. BLAST FURNACE & CAST HOUSES
204. STOVES
205. STOCK HOUSE
206. LADLE REPAIR SHOP
207. PIG CASTING MACHINE
208. PIG STORAGE
209. BLOWER HOUSE
210. GAS CLEANING PLANT
212. PROPANE STORAGE
213. 11.81 MW D G SET
213a. 10.5x2 MW D G SETS
214. PUMP HOUSE NO.1
215. D.G.SET ROOM & MCC ROOM
216. EXPANSION TANKS
217. PLATE HEAT EXCHANGER
218. AIR WATER HEAT EXCHANGER
219. PUMP HOUSE NO.2
220. PUMP HOUSE NO.3
221. BLOWER HOUSE SUB STATATION
222. HEAT RECOVERY UNIT
223. DUST CATCHER
224. BFLC–1
225. CAST HOUSE WEST(RIGHT)
226. CAST HOUSE EAST (LEFT)
227. COMPRESSOR HOUSE
228. PUMP HOUSE NO.4
229. FILTER HOUSE
230. CLARIFIER
231. COOLING TOWER 1
232. COOLING TOWER 2
233. COOLING TOWER 3
234. DRY SLAG PIT NO.1
235. DRY SLAG PIT NO.2
236. SLAG GRANULATION PLANT
237. FLARE STACK
238. BFLC–3
239. CAST HOUSE FUME EXTRACTION SYSTEM
240. IMIL STORE
241. 450 TONS WEIGH BRIDGE
242. BFLC–3
243. STOCK HOUSE DUST EXTRACTION SYSTEM
245. DEBRICKING PIT
246. LADLE DRYER
247. LADLE COOLING STATATION
248. COAL PREPARATION PLANT (FUTURE)
249. OIL INJECTION & BOILER
250. 20 KL NITROGEN PLANT
251. LOCO REPAIR SHED
252. OIL STORAGE SHED
253. TRAINING HALL
254. TRAINING HALL
255. RMLC–2 BLDG
256. RMHS MCC–5
257. COLD BRIQUETTING PLANT
258. FIRE FIGHTING BOSTER PUMP HOUSE
259. EMERGENCY OVERHEAD WATER TANK
260. COKE OVEN PLANT
262. BATCHING PLANT
263. PAVER BLOCK MFG. PLANT
264. DHARTI IMPEX PVT. LTD.
265. COKE DRYER PLANT

SPONGE IRON PROJECT

1. PELLET AND OXIDE STORAGE AREA
2. PRIMARY SCREEN HOUSE
3. DRY AND WET SCREEN HOUSE (PELLET & OXIDE)
4. SLUDGE POND
5. OXIDE DAY BINS
6. FURNACE AREA
7. REFORMER AND HEAT RECOVERY AREA
8. PRODUCT DAY BINS
9. PRODUCT SCREEN HOUSE
10. MAIN SUB–STATION & CONTROL ROOM
11. CLARIFIER
12. RAW WATER SUPPLY FACILITY
13. GAS RECEIVING STATION & METERING STN.
14. MSEB SWITCH YARD
15. 220 KV SWITCH YARD
16. GUEST HOUSE
18. EXISTING CEMENT GODOWN
19. PROPOSED OIL & LUB. STORAGE AREA(TEMP)
20. PRODUCT WARE HOUSE
21. 50TPD OXYGEN PLANT(SIP)
22. COLD BRIQUETTING PLANT

HOT STRIP MILL PROJECT

52. CALCINING PLANT
53. STEEL MELT SHOP
54. CONTINIOUS CASTING DEPARTMENT
55. TUNNEL FURNACE
56. HOT STRIP MILL
57. ROLL SHOP
58. COIL YARD
59. SCALE PIT FOR CCM
60. SCALE PIT FOR HSM
61. ELECTRICAL CONTROL ROOM FOR HSM
62. MOTOR ROOM FOR HSM
63. ELECTRICAL CONTROL ROOM FOR LAMINAR COOLING
64. SCALE PIT FOR LAMINAR COOLING
65. AIR SEPARATION PLANT(1260 TPD INOX)
65B. BUFFER VESSEL(O2,N2 & Ar)
66. GAS CLEANING PLANT–(PH.–I)
66A. GAS CLEANING PLANT–(PH.–II)
67. BOILER PLANT
68. CHILLED WATER PLANT
69. SPACE FOR FUTUR OIL AND LUB STORES
70. LDO STORAGE
71. MAIN RECEIVING SUB– STN.
72. COMPENSATION EQUIPMENT
73. LOAD BLOCK SUB–STN
74. LBDS FOR CCM
75. SVC AND 6.6. KV COMPENSATION EQUIPT.
76. DRINKING WATER FILTARATION PLANT
76a. DRINKING WATER OVERHEAD TANK
77. RAW WATER TREATMENT FACILITY
78. MAKE UP WATER PUMPHOUSE
79. SLUDGE WATER TANK
80. WASTE WATER TREATMENT PLANT FOR HSM
81. PUMPS AND COOLING TOWER FOR HSM
82. SOFT WATER TANK AND PUMPS
83A. RECIRCULATING SOFT WATER FACILITY–SMS(GCP–2)
83B. RECIRCULATING WATER FACILITY–SMS(PH–I)
83C. RECIRCULATING SOFT WATER FACILITY–SMS(GCP–1)
83D. RECIRCULATING WATER FACILITY–SMS(PH–2)
85. GENERAL STORES
86. REPAIR SHOP
87. OVERHEAD WATER TANK
88. FIRE BRIGADE AND FIRST AID STATION
92. GOA GATE
93. MSEB. SWITCH YARD
94. REFRACTORY STORES
95. OXYGEN PLANT–90 TPD
96. 6.6 KV COMPENSASION EQUIPMENT.
97. MILL LAB.
98. LDO DAY TANK
98A. LDO DAY TANK
99. SCRAP YARD
100. CHIMNEY FOR GCP
101. BUS PARKING
102. RAW WATER RESERVIOUR
103. OIL SOAK PIT
104. LCSS–3 NEAR MRSS
106. EQUIP. MANF.SHOP
107. GTL SHED
108. NEW HSM BUILDING(SMS LAB.)
109. CANTEEN BUILDING EXTENTION
110. D. G. SHED
111. HEALTH CENTER
112. KNOWLDGE CENTER
114. LPG STORAGE
115. OXYGEN PLANT–300 TPD (INOX)
116. 1X53.5 MW CAPTIVE POWER PLANT
117. DRI DE DUSTING SYSTEM (WET)
118. HARSCO METALS PLANT

PROPOSED PELLET PLANT–2

EXISTING GREEN BELT

PROPOSED GREEN BELT

R.No.	BRIEF RECORD	DATE	DRN
DATE	19/07/17	ALL DIMENSIONS ARE IN mm.	
	NAME / SIGNATURE	TOLERENCE AS PER IS:2102	
DRN.		SUR. FINISH IN MICRONS IS:10719	
CHD.		TOTAL WT. (Kg)	
APD.		SCALE: 1:15,000	

JSW Steel Limited

GEETAPURAM, DOLVI, TAL. PEN, DIST. RAIGAD, MAHARASHTRA.

5.0 TO 10.0 MTPA EXPANSION OF INTEGRATED STEEL PLANT AT DOLVI

GENERAL LAYOUT

SHEET SIZE: A1 | REF. DRAWING No. XXXXXX | DRAWING No. JSW/DW/PR/005 | REV.No. 6

F. No. J-11011/76/2013-IA II (I)
Government of India
Ministry of Environment, Forest and Climate Change
(I.A. Division)

Indira Paryavaran Bhawan
Jor Bagh Road, Ali Ganj,
New Delhi - 110003
E-mail: satish.garkoti@nic.in
Tele ph.: 011: 24695316

Dated: 24th/25th August, 2015

To

M/s JSW Steel Ltd.
Thapar House, 3rd Floor
Eastern Side of Central Wing,
124, Janpat Lane,
New Delhi-110001

Email:Nil; Fax No.- 91 11- 43724333

Subject: Expansion of Integrated Steel Plant from 5 MTPA to 10 MTPA and Power Plant from 300 MW to 600 MW (Gas Based) of M/s JSW Steel Limited at Geethapuram, Village Dolvi, Tehsil Pen, District Raigarh in Maharashtra – Environmental Clearance regarding

Sir,

This has reference to your letter No. Nil dated 6th February, 2015 along with copies of EIA/EMP report seeking Environment Clearance under the provisions of the EIA Notification, 2006 for the project mentioned above. The ToR to the project was awarded by MoEFCC vide letter dated 28th May, 2013 for preparation of EIA/EMP report. The proposed project activity is listed at S.No. 3(a) in primary metallurgical industry under Category 'A' of the Schedule of EIA notification 2006 and appraised by the Expert Appraisal Committee (Industry).

2. The Ministry of Environment, Forest and Climate Change (MoEFCC) has examined your application for EC for the aforesaid project. It is noted that M/s JSW Steel Limited (JSWSL) proposes to expand the integrated steel plant to 10.0 MTPA from existing 5.0 MTPA at Geetapuram, Dolvi in Raigad District of Maharashtra. The existing steel plant is based on the Direct Reduced Iron (DRI) - Blast Furnace-CONARC–Ladle Furnace & VD/VOD - Continuous Casting – Rolling Mill (CSP) route. The expansion would be based on proven BF - BOF route. Expansion of 3.0 MTPA Steel Plant to 5.0 MTPA and 300 MW Captive Power Plant is under implementation. The site falls between Longitude - 73°00'00" - 73°05'00" E, Latitude - 18°39'00" - 18°45'00" N. Land comprises Dolvi, Jui Bapuji & khar Karavi Villages. Pen is the nearest railway station at about 8 km (aerial distance) on the Konkan Railway line connecting Mumbai-Mangalore along the West Coast of India. The nearest airport is Mumbai (national and international) located about 80 km in the north direction from the proposed project site. The company has about 1200 acres of land in its possession for its existing operating integrated steel plant complex of 5.0 MTPA capacity. Some of the proposed additional capacities are proposed to be setup within the existing plant

and some need relocated by acquiring additional 600 acres land. There is no national park, biosphere reserve, sanctuary, habitat for migratory birds, archaeological site, defence installation etc. within 10 km of the periphery of the plant boundary. The total project cost is estimated to be Rs. 17,000 Cr. The CSR budget is Rs 225 cr for 5 MTPA project and Rs 425 Cr for 10 MTPA project. The requirement of total manpower for proposed expansion project will be about 5,000. However, the proposed Integrated Steel Plant will additionally generate more than 15,000 indirect secondary and tertiary employment.

3.0 The production facilities after the expansion is given below: **(Expansion of JSWSL (existing 5 MTPA to 10 MTPA))**

Sl. No.	Technological facility	Units / Facilities (EC accorded) under 5 MTPA	Proposed facilities under 5 to 10 MTPA	Total Plant Capacity AT 10 MTPA
1.	DRI (Gas based Mega Module)	2.0 MTPA (by augmentation)	2.0 MTPA	4.0 MTPA
2.	Pellet Plant	4.0 MTPA	4.0 MTPA	8.0 MTPA
3.	Coke Ovens including By-product plant	2.0 MTPA	2.5 MTPA	4.5 MTPA
4.	Sinter Plant	2.8+ 3.2 MTPA	8.0 MTPA	14.0 MTPA
5.	Blast Furnace including Pig casting	3.6 MTPA by modification of existing Blast Furnace	4.5 MTPA	8.1 MTPA
6.	SMS (CONARC)	5.2 MTPA (By Augmenting the existing facilities)	-	5.2 MTPA
7.	SMS -BOF	-	6.0 MTPA	6.0 MTPA
8	Ladle Furnace(LF)	2x200 t +205 t	2X300 t	2x200 t + 205 t 2X300 t
9.	VD/VOD & RH-TP	1x200 t + 1x205 t	2x300 t	1x200 t + 1x205 t 2x300 t
10.	CSP(HRC Coil) Thin Caster-cum-Hot Strip Finishing Train	3.5 MTPA (By Augmenting)	-	3.5 MTPA
11.	Conventional Slab Caster	2x1 strands (3.68 MTPA)	2x2 strands (5.72 MTPA)	Total 6 strands (9.4 MTPA)
12.	Billet Caster	-	1x6 Strands	6 strands (1.5 MTPA)

Sl. No.	Technological facility	Units / Facilities (EC accorded) under 5 MTPA	Proposed facilities under 5 to 10 MTPA	Total Plant Capacity AT 10 MTPA
13.	Plate Mill	1.5 MTPA	-	1.5 MTPA
14.	CRM (Hot Rolled Skin Pass + Cold Rolled Full Hard Coil + Hot Rolled Pickled & Oiled Coil)	1.0 MTPA	1.5 MTPA	2.5 MTPA
15.	Galvanizing Line (Cold Rolled Steel Strips, Hot Dip Zinc Coated Full Hard)	0.6 MTPA	-	0.6 MTPA
16.	Electrical Steel CRGO line	0.4 MTPA	-	0.4 MTPA
17.	Tin Plate Mill	0.4 MTPA	-	0.4 MTPA
18.	Colour Coating Plant	0.5 MTPA	-	0.5 MTPA
19.	Lime /Dolo Plant	1800 TPD	1800 TPD	3600 TPD
20.	Oxygen Plant	4100 TPD	3500 TPD	7600 TPD
21.	Hot Rolling Mill with shearing & slitting line	-	5.0 MTPA	5.0 MTPA
22.	Bar Mill	-	1.4 MTPA	1.4 MTPA
23	Slag & Clinker Grinding Unit	-	10 MTPA	10 MTPA
24.	Captive Power Plant	300 MW	300 MW	600 MW (based on surplus gases of BF & Coke Oven) +RLNG
25.	Township	-	150 acres	150 acres

The list of raw materials required for the project:

Sr. No	Description	Raw Material Requirements at (10 Mtpa)		
		Quantity	Source	Mode of transport
A	Iron bearing raw materials (IBRM)			
1	C.L.O.	0.38	NMDC/Imported	Rail/ Sea
2	Iron Ore Fines	19.72	Imported	Sea
	Total	20.1		
B	Fluxes			
1	Lime stone (40-80 mm)	1.30	Imported	Sea

2	Dolomite (40 to 80 mm)	0.72	Imported	Sea
3	Lime stone (Sinter grade)	0.71	Imported	Sea
4	Dolomite (Sinter grade)	1.55	Imported	Sea
5	Quartzite	0.24	Rajasthan	Rail
Total		4.52		
C	Carbon bearing raw material (CBRM)			
1	a) Hard Coking coal 60%	3.72	Imported	Sea
	b) Semi Hard Coking coal 40%	2.59	Imported	Sea
2	PCI Coal	1.25	Imported	Sea
3	Coke breeze	0.18	Indigenous	-
4	Anthracite (Low VM, Ash)	0.23	Imported	Sea
Total		8.02		
Grand Total		32.64	All Figures are in Million ton	

4.0 The total water requirement for the 10 MTPA steel plant, 600 MW power plant and township will be about 116 MLD. At present JSW ISPAT Steel Ltd., Dolvi Works has been allocated about 56 MLD water from River Amba, Nagothane, K.T.Bandhara and consent for 30 MLD has been obtained. Application is in progress for the balance amount. M/s JSW has permission for drawl of 53.66MLD from Irrigation Dept., Govt. of Maharashtra. Water drawl from River Amba sanctioned. Permission for additional 65MLD water is under consideration of Govt. of Maharashtra. It was further stated that the region receives heavy rainfall of about 3000mm annually and surplus water is available in the Dam.

5.0 The wastewater generated from the indirect cooling circuit would be routed through the cooling tower and pressure filter for recycling purpose. The wastewater generated from the coke ovens will be treated in a bio-oxidation plant to reduce the level of phenolic compounds, oil & grease and cyanide. The treated wastewater will be reused in the system. The wastewater of gas cleaning plants of blast furnace and steel melt shop containing suspended solids will be clarified in the wastewater treatment plant. The clarified water will be recycled to the waste gas cleaning units. Similarly, the wastewater coming out from the continuous casting machine will be treated to remove scale and oil and the treated water will be recycled after cooling. The plant sanitary waste water will be treated in sewage treatment plant and the treated water will be used for dust suppression and maintenance of plant green belt.

6.0 De-dusting system with bag filters at all dust generating locations in all the units have been installed to control the dust emissions as well as in the BF cast house and SMS and dust emission levels at work zone are within prescribed limits. For the expansion project (5 MTPA), which is under various stages, secondary fugitive dust emission system will be installed at the BF Cast House, SMS and all other units.

7.0 Public hearing was conducted on 28.01.2014 at Pen Education Society's Jaikisan Vidya Mandir and Higher Medium School at Wadhkal, Taluk. Pen, Dist. Raigad, Maharashtra. The issues raised during the public hearing inter alia include measures for pollution control, information on gas holder installed in the project, infrastructure development for water supply in the neighbouring areas, repair of roads, road traffic, development of fishing activity, repair of kharland Bund, arrangement for village candidates sent for training in Bellary, more employment for the locals etc.

8.0 The matter was considered in the 31st EAC meeting held on 8th – 9th January, 2015, when it was decided to visit the site. Accordingly, site visit was conducted on 9th March, 2015 by a sub-committee. Based on the site visit report of the Sub-Committee and its recommendation the proposal was further considered by the Expert Appraisal Committee (Industry) during its 35th meeting held on 26th – 27th March, 2015 and recommended the project for environment clearance subject to stipulation of the following specific conditions and other mitigative measures and conditions for environmental protection:

9.0 The Ministry of Environment, Forest and Climate Change (MoEFCC) on the basis of the aforesaid recommendations of the EAC (I), hereby decided to grant Environmental Clearance to the project under the provisions of EIA Notification dated 14th September 2006, subject to strict compliance of the following Specific and General conditions:

A. SPECIFIC CONDITION:

i. The project proponent should install 24x7 air and water monitoring devices to monitor air emission and effluent discharge, as provided by CPCB and submit report to Ministry and its Regional Office.

ii. The PP should ensure treatment of effluent particularly from Blast Furnace (BF) and Coke Oven plant. The plant should be designed to meet the cyanide standards stipulated by MoEFCC under EPA Act 1986.

iii. The commitment made by the PP for plantation of the green belt to the tune of 655 acres should be expedited. Three rows of green belt, 12 – 15 meters wide, all along the periphery of the plant should be planted.

iv. The CSR plan as submitted by the PP in the area of health care, rural infrastructure development, education, sports and cultural activity, Swachh Bharat Abhiyan with respect to the earlier projects and the ongoing project at Dolvi site are very slow in implementation. The CSR activities should be implemented expeditiously and simultaneously with the implementation of the project, and annual report on CSR activity should be submitted to the Ministry.

v. At least 5 % of the total cost of the project should be earmarked towards the Enterprise Social Commitment (ESC) based on local needs. The proponent should prepare a detailed CSR Plan for every next 5 years for the existing-cum-expansion project, which includes village-wise, sector- wise (Health, Education, Sanitation, Health, Skill Development and infrastructure requirements such as strengthening of village roads, avenue plantation, etc) activities in consultation with the local communities and administration. The CSR Plan will include the amount of 2% retain annual profits as provided for in Clause 135 of the Companies Act, 2013 which provides for 2% of the average net profits of previous 3 years towards CSR activities for life of the project. A separate budget head should be created and the annual capital and revenue expenditure on various activities of the Plan should be submitted as part of the Compliance Report to RO, at Bhopal. The details of the CSR Plan should also be uploaded on the company website and should also be provided in the Annual Report of the company.

vi. No development should be done on the creek-ward side of the land. Land area between HTL to 100 mts or width of the creek, whichever is less, on the landward side should be kept free from any type of development.

vii. Full utilization of slag both BF and SMS should be implemented. The details should be submitted along with 6 monthly compliance report.

viii. No waste water will be discharged outside the plant boundary during normal operation. In case it become necessary to discharge effluent meeting norms fit to the marine environment, permission of the relevant authority should be obtained.

ix. No untreated effluent should be reused for any process.

x. Measures should be taken to reduce PM levels in the ambient air. Stack of adequate height & diameter with continuous stack monitoring facilities for all the stacks should be provided and sufficient air pollution control devices viz. Electrostatic precipitator (ESP), bag house, bag filters etc. should be provided to keep the emission levels below 50mg/Nm3 and installing energy efficient technologies in the Plant.

xi. On-line ambient air quality monitoring and continuous stack monitoring facilities for all the stacks should be provided and sufficient air pollution control devices. Gaseous emission levels including secondary fugitive emissions from all the sources should be controlled within the latest permissible limits issued by the Ministry vide G.S.R. 414(E) dated 30th May, 2008 and regularly monitored. Guidelines / Code of Practice issued by the CPCB should be followed.

xii. Dust suppression system and bag filters should be installed to control the fugitive dust emissions at conveyor and transfer points, product handling, loading and unloading points.

xiii. Water consumption should not exceed as per the CREP standard prescribed for the steel plants. Additional water, if any, required for the plant project operations should be met form rainwater stored in rainwater harvesting structures.

xiv. Rainwater harvesting scheme should be prepared so that the rainwater can be collected, re-used and may be used for ground water recharge. The concrete drains should be de-silted and regular supervision of the areas should be carried out so that blocking of drains may be avoided for quick discharge of rainwater. Efforts should further be made to use maximum water from the rain water harvesting sources. If needed, capacity of the reservoir should be enhanced to meet the maximum water requirement.

xv. All the effluents should be treated and reused for dust suppression/green belt development. No effluent should be discharged and 'zero' discharge should be adopted.

xvi. Full utilization of fly ash should be ensured as per Fly Ash Notification, 1999 and subsequent amendment in 2003 and 2010. All the fly ash should be provided to cement and brick manufacturers for further utilization and Memorandum of Understanding should be submitted to the Ministry's Regional Office at Bhopal.

xvii. Hazardous materials required during construction phase and in plant operations should be stored properly as per the regulations and reused/recycled as per the E(P)A Rules.

xviii. Vehicles and construction machinery are properly maintained to minimize the exhaust emission as well as noise generation to meet prescribed standards.

xix. Risk and Disaster Management Plan along with the mitigation measures should be prepared and implemented.

xx. All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel Plants should be implemented.

xxi. All the commitments made to the public during public hearing/public consultation should be satisfactorily implemented and adequate budget provision should be made accordingly.

xxii. All the permanent workers should be covered under ESI Scheme. The company should have the provision for treatment of its workers at the local Nursing Homes & Hospitals in case of emergency. Annual Medical Check-up on some medical parameters like Blood test, Chest X-Ray, Eye test, Audiometry, Spirometry etc. should be conducted amongst the employees of the Company.

B. GENERAL CONDITIONS:

i. The project authorities must strictly adhere to the stipulations made by the Maharashtra Pollution Control Board and the State Government.

ii. No further expansion or modifications in the plant should be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEFCC).

iii. At least four ambient air quality monitoring stations should be established in the downward direction as well as where maximum ground level concentration of PM_{10}, $PM_{2.5}$, SO_2 and NO_X are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission should be regularly submitted to this Ministry including its Regional Office at Nagpur and the SPCB/CPCB once in six months.

iv. Industrial wastewater should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended form time to time. The treated wastewater should be utilized for plantation purpose.

v. The overall noise levels in and around the plant area should be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).

vi. Occupational health surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.

vii. The company should develop rain water harvesting structures to harvest the rain water for utilization in the lean season besides recharging the ground water table.

viii. The project proponent should also comply with all the environmental protection measures and safeguards recommended in the EIA/EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like community development programmes, educational programmes, drinking water supply and health care etc.

ix. Requisite funds should be earmarked towards capital cost and recurring cost/annum for environment pollution control measures to implement the conditions stipulated by the Ministry of Environment, Forests and Climate Change (MoEFCC) as well as the State Government. An implementation schedule for implementing all the conditions stipulated herein should be submitted to the Regional Office of the Ministry at Nagpur. The funds so provided should not be diverted for any other purpose.

x. A copy of clearance letter should be sent by the proponent to concerned Panchayat, Zila Parishad/Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter should also be put on the web site of the company by the proponent.

xi. The project proponent should upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and should update the same periodically. It should simultaneously be sent to the Regional Office of the MOEFCC at Nagpur. The respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; PM_{10}, SO_2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects should be monitored and displayed at a convenient location near the main gate of the company in the public domain.

xii. The project proponent should also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEFCC, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry at Nagpur / CPCB / SPCB should monitor the stipulated conditions.

xiii. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, should also be put on the website of the company along with the status of compliance of environmental conditions and should also be sent to the respective Regional Office of the MOEFCC at Nagpur by e-mail.

xiv. The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of

Environment, Forests and Climate Change (MoEF&CC) at http:/envfor.nic.in. This should be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one should be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional office at Nagpur.

xv. Project authorities should inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.

10. The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

11. The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner should implement these conditions.

12. The above conditions should be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008 and the Public (Insurance) Liability Act, 1991 along with their amendments and rules.

22/9/2015

(Dr. Satish C. Garkoti)
Scientist 'F'

Copy to:-

1. The Secretary, Department of Environment, Govt. of Maharashtra.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, New Delhi, 110 032.
3. The Chairman, Maharashtra Pollution Control Board, "Kalpataru Point, 3rd and 4th floor, Opp. Cine Planet, Sion Circle, Road Number 8, Jay BharatMata Nagar, Air Force Quarters, Sion, Mumbai, Maharashtra 400022".
4. The Additional Principal Chief Conservator of Forests (C) Ministry of Environment Forest And Climate Change Regional Office Regional Office (WCZ), Nagpur
5. Guard File / Record File/Monitoring file.

(Dr. Satish C. Garkoti)
Scientist 'F'

F. No. J-11011/76/2013-IA.II(I)
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)

Indira Paryavaran Bhawan
Jor Bagh Road, Aliganj,
New Delhi - 110003
E-mail: sharath.kr@gov.in
Tel: 011-24695319

Dated: 23rd January, 2018

To

The President,
M/s JSW Steel Ltd,
Geetapuram, Dolvi, Taluka: Pen,
District: Raigad, Maharashtra 402107
Tel: (02143) 246000/2467000/277501-15; Fax: (02143) 277533-42

Subject: Expansion of Integrated Steel Plant (5 MTPA to 10 MTPA) and Gas Based Power Plant (300 MW to 600 MW) at Geethapuram, Village Dolvi, Tehsil Pen, District Raigad in Maharashtra by M/s JSW Steel Limited – Amendment in Environmental Clearance regarding.

Sir,

This has reference to your online proposal no. **IA/MH/IND/41055/2015** dated 15th January, 2016; **IA/MH/IND/18771/2012**, dated 10th August 2016 and your communications dated 8th February 2017; 23rd May 2017; 22nd June 2017; 20th July 2017; and 2nd November 2017 for partial transfer of 1.0 MTPA Coke-Oven Plant and 2.5 MTPA 'Coke-Oven including by-product plant' to M/s Dolvi Coke Projects Limited and 10 MTPA Slag & Clinker Grinding unit to M/s JSW Cement Limited respectively from M/s JSW Steel Limited.

2.0 The Environmental Clearance to the expansion project of Integrated Steel plant from 3.0 MTPA to 5.0 MTPA at Village Dolvi, Taluka Pen, District Raigad in Maharashtra was accorded vide letter J-11011/166/2011-IA-II (I) dated 21st November 2012 to M/s JSW Steel Ltd and further expansion of its project up to 10 MTPA was accorded environmental clearance vide letter J-11011/76/2013-IA II (I) dated 25th August 2015.

3.0 The proposal was considered in the Expert Appraisal Committee (Industry-I) in its 19th meeting held during 8th – 9th June 2017; 20th meeting held during 10th – 11th July 2017 and 21st meeting held during 10th – 11th August, 2017.

4.0 After detailed deliberations, the committee recommended for the transfer of 1.0 MTPA Coke-Oven Plant and 2.5 MTPA 'Coke-Oven including by-product plant' to M/s Dolvi Coke Projects Limited (new company) and 10 MTPA Slag & Clinker Grinding unit to M/s JSW Cement Limited (new company) from M/s JSW Steel Limited (parent company) with specific and general conditions which are agreed by project proponent during the EAC meeting.

5.0 The Ministry of Environment, Forest and Climate Change, based on the recommendations of the Expert Appraisal Committee (Industry-I), decided to transfer the Environmental Clearance of 1.0 MTPA Coke-Oven Plant and 2.5 MTPA 'Coke-Oven including by-product plant' to M/s Dolvi Coke Projects Limited (new company) and 10 MTPA Slag & Clinker Grinding unit to M/s JSW Cement Limited (new company) from M/s JSW Steel Limited (parent company) located at Geethapuram, Village Dolvi, Tehsil Pen, District Raigad in Maharashtra under clause 11 of EIA Notification, 2006 and subsequent amendments.

6.0 The environmental clearance vide letter no. J-11011/76/2013-IA.II(I) dated 25th August 2015 will be henceforth exclusive of 1.0 MTPA Coke-Oven Plant; 2.5 MTPA Coke-Oven including by-product plant; and 10 MTPA Slag & Clinker Grinding unit.

7.0 All the conditions stipulated in environmental clearance vide letter no. J-11011/76/2013-IA.II(I) dated 25th August 2015 will be remain unchanged.

8.0 Implementation of the Enterprises Social Responsibility (ESR) and CSR; no change in the pollution load; and no conflict in sharing in common facilities in day to day operations shall be responsibility of the parent company i.e. JSW Steel Limited.

9.0 The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

10.0 This letter is issued in partial modification of the J-11011/76/2013-IA.II(I) dated 25th August 2015.

11.0 Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

This issues with the approval of Competent Authority.

(Sharath Kumar Pallerla)
Scientist 'F' / Director

Copy to:-

1. **The Secretary**, Department of Environment, Govt. of Maharashtra, Mantralaya, Mumbai.
2. **The Secretary**, Department of Forests, Govt. of Maharashtra, Mantralaya, Mumbai
3. **The Additional Principal Chief Conservator of Forests**, Regional Office (WCZ), Ministry of Environment, Forest and Climate Change, Nagpur
4. **The Chairman**, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
5. **The Member Secretary**, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
6. **The Chairman**, Maharashtra Pollution Control Board, Kalpatru Point, Sion Circle, Sion (East), Mumbai-400 022, Maharashtra.
7. **The District Collector**, Raigad District, Maharashtra.
8. **Guard File / Record file / Monitoring file.**
9. **MOEF&CC Website.**

(Sharath Kumar Pallerla)
Scientist 'F'/Director

DRG. No. MEC/11/02/Q7GK/PR/PP/01

Annexure 2.1

UNIT

1. Wet Grinding including Bin storage
2. Thickener
3. Slurry storage tank
4. Filtration
5. Emergency filter cake stock pile
6. Dosing & Mixing
7. Balling including electrical sub-station
8. Induration
9. Screening
10. Emergency pellet stock pile
11. Pellet bin storage
12. Process gas handling
13. Plant dedusting
14. Coarse additive Ground storage unit
15. Coarse additive bin storage unit & additive grinding unit
16. Pump house & cooling tower
17. Compressed air station for filter press
18. Plant compressed air
19. Office building
20. Fan electric sub-station
21. HT cum LT sub-station
22. Chiller plant
23. Fire fighting pump house
24. DG Station
25. LT Substation
26. Bag filter based dedusting system for product pellet bin storage

TOP : ♦

- A. Incoming IOF
- B. Additives
- C. Outgoing Pellet
- D. Water
- E. Power
- F. Gas

FOR REPORT PURPOSE ONLY

JSW Steel Limited, Salav
GEETAPURAM, DOLVI, TAL. PEN, DIST. RAIGAD, MAHARASHTRA

FEASIBILITY REPORT

मेकॉन लिमिटेड
MECON LIMITED

NOTES.
1. ± 0.00M CORRESPONDS TO +4.00M (M.S.L.) WHICH IS FINISHED FLOOR LEVEL (F.F.L.)

CONCURRED BY.

REV. SEC.	DATE	ZONE	DESCRIPTION	BY	VERIFIED
0			REVISION		

REFERENCES

DRAWING NUMBER

SCALE	1:1000	DATE	
DSGND. BY	AKP/PK		
DRAWN BY	PK		
CHKD. BY	AKP/KS		
APPVD. BY	SKB/SB		

OVERALL LAYOUT OF PELLET PLANT #2 (PRELIMINARY)

SHT. SIZE A1

JOB No. | DRG. No. MEC/11/02/Q7GK/FR/PP/01 | SHEET: 1 OF 1 | REV.0

SUBMITTED FOR: APPROVAL | INFORMATION | REFERENCE | RECORD | CONSTRUCTION

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS
& CLIMATE CHANGE

सत्यमेव जयते

Regional Office (WCZ)
Ground Floor, East Wing
New Secretariat Building
Civil Lines, Nagpur - 440001
E-mail: apccfcentral-ngp-mef@gov.in

F.No:5-4/2013(ENV)/ Date: 04.10.2017

To,

Director
Member Secretary
IA Division (CRZ Section)
Ministry of Environment, Forest & Climate Change
Indira Paryavaran Bhawan,
Aliganj, Jorbagh Road,
New Delhi-110003

Sub: Environmental clearance for the expansion form 5.0 MTPA to 10 MTPA and Power Plant from 300 MW to 600 MW (Gas Based) at Geethapuram, Village Dolvi, Tehsil Pen, District Raigad in Maharashtra M/s JSW Steel Limited

Ref:

1. MoEF& CC letter F. No. J-11011/76/2013-IA II(I) dated 25.08.2015
2. MoEF letter F. No. J-11011/166/2011-IA-II (I) dated 21st November 2012

Sir,

I am directed to invite your kind attention on the above subject and letter under reference. Monitoring report of compliance to conditions stipulated in Environment Clearance accorded for expansion form 5.0 MTPA to 10 MTPA and Power Plant from 300 MW to 600 MW (Gas Based) at Geethapuram, Village Dolvi, Tehsil Pen, District Raigad in Maharashtra M/s JSW Steel Limited is enclosed herewith. Site inspection has been carried out on 03.08.2017. Following observations were made during the site inspection:

Ministry granted environmental clearance for the expansion of Integrated Steel Plant from 5 MTPA to 10 MTPA and Power Plant from 300 MW to 600 MW (Gas based) vide letter dated 25.08.2015. As per the details provided only Billet Caster (1.5 MTPA) and Bar Mill (1.4 MTPA) have been completed. Work of expansion of all other units is yet to be started. The statement showing the status of the work is enclosed as **Annexure-1**. Hence the compliance status of conditions stipulated in environmental clearance granted for expansion from 3.0 MTPA to 5.0 MTPA Integrated Steel Plant along with installation of Pellet Plant - 4.0 MTPA and 300 MW Captive Power Plant at Geethapuram, Village Dolvi, Tehsil Pen, District Raigad in Maharashtra by M/s JSW Ispat Steel Limited (formerly M/s Ispat Industries Limited) has been monitored.

Following condition was not complied:

General Condition xi:

No details provided regarding submission of copy of environmental clearance to concerned Gram Panchayat. Also copy of the EC was not uploaded to the company website.

Following conditions were partially complied:

Specific Condition xiii:

Risk and disaster management plan submitted to Regional Office after the stipulated period.

General Condition xii &xiv:

Copies of the six monthly compliance report and environment statement were not uploaded to the company website.

This issues with the approval of APCCF (Central), Regional Office, Nagpur.

A. Suresh 04/10/17

Suresh Kumar Adapa
Scientist 'D'

Encl: as above

Copy to:

1. Director RO HQ, Ministry of Environment, Forest & Climate Change, Government of India, 1st Floor Agni Wing, Indira Paryavaran Bhawan, Jorbagh Road, New Delhi-110 003
2. Director (Monitoring Cell), Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Aliganj, Jorbagh Road, New Delhi-110003
3. M/s JSW Steel Limited, JSW Centre, Bandra-Kurla Complex, Bandra (East), Mumbai-400051
4. Guard file

A. Suresh 04/10/17

Suresh Kumar Adapa
Scientist 'D'

Monitoring the Implementation of Environmental Safeguards
Ministry of Environment, Forest & Climate Change
Regional Office (West Central Zone), Nagpur

Monitoring Report
Part – I
DATA SHEET

1.	Project Type: River-valley / Mining / Industry /Thermal / Nuclear / Other (Specify)	Industry, Category 3 A (Integrated Iron & Steel Plant)
2.	Name of the Project	Expansion from 3.0 MTPA to 5.0 MTPA Integrated Steel Plant along with installation of Pellet Plant - 4.0 MTPA and 300 MW Captive Power Plant at Geethapuram, Village Dolvi, Tehsil Pen, District Raigad in Maharashtra by M/s JSW Ispat Steel Limited (formerly M/s Ispat Industries Limited) - regarding Environmental Clearance.
3.	Clearance Letter (s) / OM No. and date	Environmental Clearance from MoEF, New Delhi, File No J-11011/166/2011-IA-II (I) dated 21st November 2012.
4.	Location a. District (s) b. State (s) c. Latitude d. Longitude	 Raigad Maharashtra Latitude 18°41'05" to 18°13'55" N Longitude 73°04'00" to 73°04'48" E
5.	Address for correspondence a. Address of concerned Project Chief Engineer (with Pin Code & Telephone/ Telex/ Fax Numbers): & Address of Executive Project Engineer / Manager (with pin code/fax numbers)	 Shri. Ashok Aggarwal Jt. CEO Tel No. 02143-277501 -15 M/s. JSW Steel Ltd. Dolvi, Taluka – Pen District – Raigad, Maharashtra – 402 107
6.	Salient features a. Of the Project	1. Expansion of integrated steel plant from 3 to 5 MTPA capacity. 2. Logistically it is country's most eco-friendly integrated steel plant- being strategically located in proximity to the sea enabling nearly 100% raw material movement through sea and rail connectivity for finished goods transportation. 3. The project site is ideally situated as there is no national park, biosphere reserve, wild life sanctuary, habitat for migratory birds, archeological site,

	b. Of the Environmental Management Plan	defense installation etc. within 10 km of the periphery of the plant boundary 4. The steel project has been conceived with implementing the Best Available Environment friendly Technologies in steel making, coke ovens, blast furnace, Sinter Plant & Mills. **Proposed Clean Technologies:** 1. Raw material handling: Covered storage for raw material 2. Blast Furnace: Largest BF with TRT, PCI, SH & CH De-dusting system 3. Sinter Plant: EOS system in Sinter Plant and WHRB from Sinter cooler 4. Coke Oven: Coke dry quenching (CDQ) & Power Generation, HPLA (n, n-1 & n+2), Land based charging and pushing emission control Coke oven gas desulphurization, Single SCP Car to control charging emissions 5. MBR & RO for 100% recovery of water & reuse. b. **Environment management Plan** is attached is Annexure 15 (i).
7.	Breakup of the Project area a. Submergence Area: Forest & Non Forest b. Others	No Forest area is in the project site
	a. Total Plot Area	1200 Acres
	b. Built - Up Area (Including Road)	960 Acres
	c. Open Space available	240 Acres
	d. Green belt area	79 Acres
8.	Breakup of the Project affected population with enumeration of those losing houses/dwelling units only, agricultural land only, both dwelling units & both dwelling units & agricultural land & landless laborers/artisan a. SC, ST/Adivasis b. Others (Please indicate whether these figures are based on any scientific and systematic survey carried out or only provisional figures, if survey carried out gives details and years of survey.)	The project is within the existing plant premises. Hence Not Applicable

9.	Financial Details a. Project costs as originally planned & subsequent revised estimates and the year of price reference. b. Allocations made for Environmental Management Plan with item wise & year wise breakup. c. Benefit Cost Ratio / Internal rate of Return and the year of assessment. d. Whether (c) includes the cost of Environmental Management as shown in the above. e. Actual expenditure incurred on the Project so far f. Actual expenditure incurred on the Environmental Management Plan so far	a. The total project cost as originally estimated was Rs. 9000/- crores. b. Environment Management Cost for the 3 to 5 MTPA expansion projects is envisaged for Rs. 450 crores. c. Yet to be finalized d. Total cost of the project is inclusive of cost of Environment Management e. The total project cost for the 3 to 5 MTPA expansion projects is Rs. 2878.67 crores f. Expenditure incurred on Pollution Control equipment is Rs 267.54 crores and total expense on Environment Management during 3 to 5 MTPA expansion is Rs 480.94 crores.
10.	Forest land requirement a. The status of approval for diversion of Forestland for non-forestry use b. The Status of clearing felling c. The status of compensatory Afforestation program in the light of actual field experience	No forest land is involved. The project is proposed in the existing plant premises. Hence Not Applicable.
11.	The status of clear felling in non-forest areas (such as submergence area of reservoir, Approach roads), if any with quantitative information	Not Applicable
12.	Status of construction a. Date of commencement (Actual and/or Planned) b. Date of completion (Actual and/or Planned)	Details attached in Annexure 15 (ii).
13.	Reasons for the delay if the project is yet to start	Not Applicable
14.	Dates of site visits a. The dates on which the Project was monitored by Regional Office on previous occasions, if any. b. Date of site visit for this monitoring Report.	a. 03/01/2014 b. 03/08/2017
15.	Details of correspondence with project authorities for obtaining action plan / information on status of compliance to safeguards other than the routine letters for logistic support for site visit. (The monitoring report may obtain the details of all the letters issued so far but the later reports may cover only the letters issued subsequently).	Environmental Compliance reports are submitted to Regional officer, MoEF&CC, Nagpur regularly on six monthly basis.

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Compliance of conditions stipulated in environmental clearance granted for the expansion form 5.0 MTPA to 10 MTPA and Power Plant from 300 MW to 600 MW (Gas Based) at Geethapuram, Village Dolvi, Tehsil Pen, District Raigad in Maharashtra M/s JSW Steel Limited by MoEF, Govt. of India, New Delhi vide letter F. No. J-11011/76/2013-IA II(I) dated 25.08.2015

Ministry granted environmental clearance for the expansion of Integrated Steel Plant from 5 MTPA to 10 MTPA and Power Plant from 300 MW to 600 MW (Gas based) vide letter dated 25.08.2015. As per the details provided only Billet Caster (1.5 MTPA) and Bar Mill (1.4 MTPA) have been completed. Work of expansion of all other units is yet to be started. The statement showing the status of the work is enclosed as **Annexure-1**.

Compliance of conditions stipulated in environmental clearance granted for the Expansion from 3.0 MTPA to 5.0 MTPA Integrated Steel Plant along with installation of Pellet Plant - 4.0 MTPA and 300 MW Captive Power Plant at Geethapuram, Village Dolvi, Tehsil Pen, District Raigad in Maharashtra by M/s JSW Ispat Steel Limited (formerly M/s Ispat Industries Limited) granted by MoEF vide letter no. J-11011/166/2011-IA-II (I) dated 21st November 2012

Specific Conditions:

S. No.	Condition	Compliance Status
I	Measures shall be undertaken to mitigate particulate levels in the ambient air and a time bound action plans shall be submitted. On-line ambient air quality monitoring with proper O&M and continuous stack monitoring facilities for all the process stacks shall be provided and sufficient air pollution control devices viz. Electrostatic precipitator (ESP), gas cleaning plant, scrubber, bag filters etc. shall be provided to keep the emission levels below 50 mg/Nm3 by installing energy efficient technology.	**Complying with**. As per the details provided, continuous stack emission monitoring system has been installed for all process stacks. ESP, bag filter, scrubbers and de-dusting systems have been provided for controlling the process emissions and fugitive emissions. Details of the air pollution control systems are enclosed as **Annexure-2**. As per the monitoring data, the emission levels found to be within prescribed standards. Also 5 numbers of online ambient air quality monitoring systems have been installed for continuous monitoring of ambient air quality levels.
Ii	As proposed, Electrostatic precipitator (ESP) shall be provided to sinter/pellet plant, WHRB, DE Plants and dust catcher followed by venturi scrubbers to blast furnace to control SPM levels within 50 mg/Nm3. Fume extraction system shall be provided to induction furnaces to control the emissions within the prescribed standards.	**Complied**. Electrostatic precipitator has been provided for the Sinter/Pellet plant, WHRB, DE plants. Dust catcher followed by Venturi scrubber has been provided for the blast furnace. There is no Induction Furnace, but in the Steel Melt Shop (SMS), Gas Cleaning Plant with bag filters having primary and secondary fume extraction system have been provided. As per the monitoring data, the emission levels found to be within prescribed standards.
iii	The National Ambient Air Quality	**PA agreed to comply with**.

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	Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November, 2009 shall be followed.	
Iv	Gaseous emission levels including secondary fugitive emissions from all the sources shall be controlled within the latest permissible limits issued by the Ministry and regularly monitored. Guidelines/Code of Practice issued by the CPCB shall be followed. New standards for the sponge iron plant issued by the Ministry vide G.S.R. 414(E) dated 30th May, 2008 should be followed.	**Complying with**. As per the details provided, secondary fugitive emissions at Blast Furnace Cast House are being controlled with Bag filters and Gas Cleaning Plant for Electric Arc Furnace (EAF) of SMS from all the sources. Regular monitoring of the air quality levels is being carried out. As per the monitoring data, emission levels were observed to be as per the prescribed standards. Pollution control equipments were installed as per the GSR 414(E) dated 30.05.2008.
V	Total makeup water requirement for expansion shall not exceed 2,590 KLD. Efforts shall further be made to use maximum water from the rain water harvesting sources. Use of air cooled condensers shall be explored and closed circuit cooling system shall be provided to reduce water consumption and water requirement shall be modified accordingly. All the effluent should be treated and used for ash handling, dust suppression and green belt development. No effluent shall be discharged and 'zero' discharge shall be adopted. Sanitary sewage should be treated in septic tank followed by soak pit.	**Complying with**. As per the water balance provided, make up water requirement is 2590 KLDa and being met from Amba River. Following water conservation measures are being adopted: • Rain water harvesting system has been implemented. • Closed circuit cooling towers are provided to optimize water consumption. • All effluent is treated & recycled in the process and reused in slag cooling, dust suppression & plantation purpose. • No waste water is being discharged outside the plant premises. • Septic tank followed by soak pit and STP (3 Nos.) provided for sewage treatment.
vi	Efforts shall be made to make use of rain water harvested. If needed, capacity of the reservoir should be enhanced to meet the maximum water requirement. Only balance water requirement shall be met from other sources.	**Complied**. Roof top Rain water harvesting system has been provided and the harvested rain water is being used in the cooling towers as make up water.
vii	Regular monitoring of influent and effluent surface, sub-surface and ground water (including chromite) should be ensured and treated wastewater should meet the norms prescribed by the State Pollution Control Board or described under the E (P) Act whichever are more stringent. Leachate study for the effluent generated and analysis shall also be regularly carried out and report submitted to the Ministry's Regional Office at Bhopal, SPCB and CPCB.	**Complying with**. As per the details provided, regular monitoring of influent and effluent surface, sub-surface and ground water is being carried out through MoEF approved and NABL accredited labs. As per the monitoring data, the water quality found to be confirming to prescribed standards. PA is submitting the monitoring reports with six monthly compliance reports.
viii	The water consumption shall not exceed as per the standard prescribed for the steel plants.	**Complying with**. As per the details provided, water consumption is 3.38 m3/ton of crude steel.

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Ix	Vehicle pollution due to transportation of raw material and finished products shall be controlled. Proper arrangements shall also be made to control dust emissions during loading and unloading of the raw material and finished product.	Transportation of raw material is through sea route to captive jetty and further to the steel plant via conveyors. Fished products are being transported through rail. Water sprinkling arrangement has been provided at the loading and unloading of raw materials.
X	All internal roads shall be black topped. The roads shall be regularly cleaned with mechanical sweepers. A 3 tier avenue plantation using native species shall be developed along the roads.	**Complied**. All internal roads are concreted & 2 nos. of vacuum based road sweeper machines have been deployed for regular cleaning of roads. Avenue plantation using native species have been planted along the roads.
xi	Proper handling, storage, utilization and disposal of all the solid waste shall be ensured and regular report regarding toxic metal content in the waste material and its composition, end use of Solid/hazardous waste should be submitted to the Ministry's Regional Office at Bhopal, SPCB and CPCB.	**Complying with**. Solid wastes like Iron ore fines, coke fines, fluxes and scales generated from the plant is being used in Sinter plant. Details of solid waste generation and reuse are being submitted to Regional Office with six monthly compliance report.
xii	Proper embankment shall be provided for the sludge disposal area.	**Complied**. Embankment has been provided to contain sludge at Sponge Iron Plant, Blast Furnace and HSM. Sludge is being used in sinter making process.
xiii	Risk and Disaster Management Plan along with the mitigation measures shall be prepared and a copy submitted to the Ministry's Regional Office at Bhopal, SPCB and CPCB within 3 months of issue of environment clearance letter.	**Partly complied**. Risk and Disaster Management Plan has been submitted to Regional Office vide letter dated 04.03.2013. Risk and disaster management plan submitted to Regional Office after the stipulated period.
xiv	As proposed, green belt shall be developed in 33 % of plant area as per the CPCB guidelines in consultation with the DFO.	**PA agreed to comply with**. As per the details provided, green belt has been developed over an area 79 acres with plantation of 200949 trees and 499068 shrubs/ herbs. PA submitted that the expansion of the steel plant from 3 to 5 MTPA and further in contiguous to earlier facilities, expansion of projects from 5 to 10 MTPA is currently being done. Accordingly, Green Belt is being developed and 33% green belt shall be completed in and outside premises as recommended by the EAC, MoEF&CC in the next 5 years once the expansion projects are completed.
xv	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Steel Plants should be implemented.	**Complying with**. PA is implementing the CREP recommendations applicable for the plant.
xvi	The company shall adopt well laid down corporate environment policy and identified and designate responsible officers at all levels of its hierarchy for	Copy of the environmental policy is enclosed as **Annexure-3**.

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	ensuring adherence to the policy and compliance with environmental clearance, environmental laws and regulations.	
xvii	All the commitments made to the public during the Public Hearing / Public Consultation meeting held on 28th February, 2012 should be satisfactorily implemented and a separate budget for implementing the same should be allocated and information submitted to the Ministry's Regional Office at Bhopal.	**Compliance is in progress**. Public hearing for the expansion project from 5 MTPA to 10 MTPA held on 28.01.2014. Implementation status is enclosed as **Annexure-4**.
xviii	At least 5 % of the total cost of the project should be earmarked towards the Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan should be prepared and submitted to the Ministry's Regional Office at Bhopal. Implementation of such program should be ensured accordingly in a time bound manner.	**Complying with**. As per the details provided, project is carrying out CSR activities in the nearby villages with activities covering in the areas such as health, education, skill development, plantation, conservation of mangroves, sports and rural development. As per the details provided, an amount of Rs. 2138.67 Lakhs have been spent on CSR activities during 2016-17.
xix	The company shall provide housing for construction labour within the site with all necessary Infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	As per the details provided, local people have been employed as construction labour, hence no temporary housing has been provided at the project area.
General Conditions:		
I	The project authorities must strictly adhere to the stipulations made by the Maharashtra State Pollution Control Board and the state government.	**PA agreed to comply with**.
Ii	No further expansion or modification in the plant shall be carried out without prior approval of the ministry of Environment and Forests.	**PA agreed to comply with**.
iii	The gaseous emission from various process units shall conform to the load/mass based standards notified by this ministry on 19th may, 1993 and standards prescribed from time to time. The State Boards may specify more stringent standards for the relevant parameters keeping in view the nature of the industry and its size and location.	**Complying with**. Gaseous emissions are being monitored continuously. As per the monitoring data, the emission levels found to be within prescribed standards.
Iv	At least four ambient monitoring stations should be established in the downward direction as well as where maximum ground level concentration of PM10, SO2	**Complying with**. Five Continuous Ambient Air Quality Monitoring stations have been installed for continuous monitoring of PM2.5, PM10, SO_2 & NOx in

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	and NOx are anticipated in consultation with the SPCB. Data on ambient air quality and stack emission shall be regularly submitted to this ministry including its regional office at Bhopal and the SPCB/CPCB ones six months.	consultation with MPCB. All these stations are connected to MPCB & CPCB servers. Also 22 Nos. Continuous Stack Emission Monitoring systems are installed at all major stacks. Monitoring data is being submitted to Regional Office with six monthly compliance reports.
V	Industrial wastewater shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th may, 1993 and 31st December, 1993 or as amended from time to time. The treated wastewater shall be utilised for plantation purpose.	**Complying with**. Effluent generated for the process units and utilities is being treated and reused in the plant. Zero discharge is being implemented. Treated water quality found to be confirming to GSR 422 (E) standards.
vi	The overall noise level in and around the plant area shall be kept well within the standards (85 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise level should conform to the standards prescribed under EPA rules, 1989 viz. 75dBA (daytime) and 70 dBA (night time).	**Complied**. Enclosures have been provided for the noise generating sources. Ear plugs have been provided for the personnel working in the noisy areas. As per the monitoring data, the equivalent noise levels found to be within prescribed standards.
vii	Occupational health surveillance of the workers should be done on a regular basis and records maintained as per the factory Act.	**Complying with**. As per the details provided, health checkup of employees is being carried out annually. The records are being maintained in Form-7 as per Factories Act.
viii	The company shall develop surface water harvesting structure to harvest the rain water for utilization in the lean season besides recharging the ground water table.	**Complying with**. Roof top Rain water is being collected and being used in the cooling towers.
Ix	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA/EMP report. Further, the company must undertake socio-economic development activities in the surrounding villages like community development programmes, drinking water supply and health care etc.	**Complying with**. • Air pollution control systems such as electrostatic precipitator, bag filters, scrubbers, de-dusting units have been provided for the plants. • Effluent treatment system has been provided. • Zero discharge is being implemented. • Green belt development is being carried out. • 22 online stack emission monitoring systems and 5 ambient air quality monitoring systems have been provided. • PA is carrying out CSR activities in the nearby villages
X	Requisite amount shall be earmarked towards capital cost and recurring cost/annum for environment pollution controls measures to implement the conditions stipulated by the ministry of	**Complying with**. As per the details provided, an amount of Rs. 309.84 Crores have been spent on environment protection measures during 2016-17.

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	environment and forest as well as the state Government. An implementation schedule for implementing all the conditions stipulated herein shall be submitted to the regional office of the ministry of the Bhopal. The funds so provided shall not be diverted for any other purpose.	
xi	A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila parishad /municipal corporation, Urban local body and the local NGO, if any, from whom suggestions / representations, if any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent.	**Not complied**. No details provided regarding submission of copy of environmental clearance to concerned Gram Panchayat. Also copy of the EC was not uploaded to the company website.
xii	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitoring data on their website and shall update the same periodically. It shall simultaneously be sent to the regional office of the MOEF at Bhopal. The respective zonal office of the CPCB and the CECB. The criteria pollutant levels namely; PM10, SO2, NOx (ambient levels as well as stack emission) or critical sectoral parameters, indicated project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	**Partly complied**. Copy of the six monthly compliance report was not uploaded to the company website. Criteria pollutant levels are being displayed at the project.
xiii	The project proponent shall also submit six monthly reports on the status of compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the regional office of MoEF, the respective Zonal office of CPCB and the SPCB. The Regional office of this Ministry at Bhopal / CPCB / , SPCB shall monitor the stipulated conditions.	**Complying with**. PA is submitting the six monthly compliance reports regularly since the grant of EC.
xiv	The Environmental Statement for each financial year ending 31st March in Form V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules 1986, as amended subsequently, shall also be put on the website of the company along with the status of	**Partly complied**. As per the details provided, Environment Statement for the year 2015-16 has been submitted to MPCB. Copy of the environment statement was not uploaded to the company website.

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	compliance conditions and shall also be sent to the respective Regional Office of the MoEF at Bhopal by e-mail.	
xv	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB and may also be seen at Website of the Ministry of Environment and Forests at http/moef.nic.in. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locally concerned and a copy of the same should be forwarded to the Regional Office, Bhopal.	**Complied**. Advertisement has been made as per the stipulation regarding the grant of EC.
xvi	Project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of concerned authorities and the date of commencing the land development work.	**Complied**. Details of financial closure and final approval of the project have been informed to Regional Office vide letter dated 04.03.2013.
11	The ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	**PA agreed upon**.
12	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.	**PA agreed upon**.
13	The above conditions shall be enforced, inter-alia under the provisions of the Water (Prevention and Control of Pollution) Act 1974, the Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act 1986, Hazardous Wastes (Management, Handling and Transboundary Movement) Rules 2008 and the Public (Insurance) Liability Act 1991 along with their amendments and Rules.	**PA agreed to comply with**.

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A-Suresh/Cm 04/10/12

सुरेश कुमार अडपा
SURESH KUMAR ADAPA
वैज्ञानिक 'डी'
SCIENTIST 'D'
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest & Climate Change
क्षेत्रीय कार्यालय (पश्चिम मध्य क्षेत्र)
Regional Office (WCZ)
नागपुर/ Nagpur -440001

Scientist 'D'

Summary Note

1. **Implementation of Conditions**:

Site inspection of the project has been carried out on 03.08.2017. Ministry granted environmental clearance for the expansion of Integrated Steel Plant from 5 MTPA to 10 MTPA and Power Plant from 300 MW to 600 MW (Gas based) vide letter dated 25.08.2015. As per the details provided only Billet Caster (1.5 MTPA) and Bar Mill (1.4 MTPA) have been completed. Work of expansion of all other units is yet to be started. Hence the compliance status of conditions stipulated in environmental clearance granted for expansion from 3.0 MTPA to 5.0 MTPA Integrated Steel Plant along with installation of Pellet Plant - 4.0 MTPA and 300 MW Captive Power Plant at Geethapuram, Village Dolvi, Tehsil Pen, District Raigad in Maharashtra by M/s JSW Ispat Steel Limited (formerly M/s Ispat Industries Limited) has been monitored.

Following condition was not complied:

General Condition xi:

No details provided regarding submission of copy of environmental clearance to concerned Gram Panchayat. Also copy of the EC was not uploaded to the company website.

Following conditions were partially complied:

Specific Condition xiii:

Risk and disaster management plan submitted to Regional Office after the stipulated period.

General Condition xii &xiv:

Copies of the six monthly compliance report and environment statement were not uploaded to the company website.

2. **Review w.r.t. MOEFs letter dated 30.5.2012:**

The above mentioned report is prepared after site visit on 03.08.2017, for the CRZ clearance for laying of 400kV double circuit dedicated transmission line from JSW Energy Generating Station at Jaigad-Ratnagiri to JSW Steel Plant at Dolvi in District Raigad, Maharashtra by M/s. JSW Energy Limited.

3. **Court Cases and show cause/closure notices:**

PA submitted provided the details of court cases against the project. As per the details provided, 2 cases are pending at NGT, Pune and one case is pending at Bombay High Court.

Consent to Operate Details:

a. MPCB granted consent to operate for DRI plant vide letter no. BO/JD(APC)/EIC No. RD-2503-13/CC-CAC-1588 dated 22.02.2013 with validity upto 31.12.2017

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b. MPCB granted consent to operate for the Hot Rolled Coil, Lime, Calcinated Dolomite, Oxygen plants vide letter dated BO/EIC No. RD-2763-14/CAC-CELL/CAC-6193 dated 25.05.2015 with validity upto 30.06.2018
c. MPCB granted consent to operate for Liquid metal/Pig Iron, Pulverised coal, Electric Power from Top Gas Recovery Turbine, Electric power from DG, M.P. Stream, Granulated Slag plants vide letter no. Format 1.0/BO/CAC-Cell/EIC No. RD-3181-15/CAC-6400 dated 13.05.2016 with validity upto 31.12.2017
d. MPCB granted consent to operate for sinter (+6 mm to 120 mm size) plant vide letter no. Format 1.0/BO/ EIC No. RD-3180-15/CAC-Cell/CAC-2512 dated 22.02.2016 with validity upto 31.12.2018
e. MPCB granted consent to operate for sinter plant vide letter no. Format 1.0/BO/ CAC-Cell/EIC No. RD-3184-15/CAC-9260 dated 19.07.2016 with validity upto 31.05.2017
f. MPCB granted consent to operate for 55 MW (gas based) power plant vide letter no. BO/JD(APC)/EIC No. RD-2517/1st Operate/CAC-5837 dated 10.07.2013 with validity upto 31.08.2017
g. MPCB granted consent to operate for High Pressure Gaseous Oxygen, Medium Pressure Gaseous Oxygen, Medium Pressure Gaseous Nitrogen, Gaseous Oxygen, Liquid Oxygen , Liquid Nitrogen, Liquid Argon plants vide letter no. Format1.0/BO/CAC-Cell/EIC No:- RD-2781-14/CAC/CAC-7988 dated 20.07.2015 with validity upto 31.03.2019
h. MPCB granted consent to operate for Gaseous Oxygen Plant vide letter no. BO/JD(APC)/EIC No.RD-2259-12/O/CC-334 dated 19.04.2012 with validity upto 31.03.2017
i. MPCB granted consent to operate for Calcinated Lime Plant vide letter no. BO/EIC No.RD-2993-15/CAC-CELL/CAC-2735 dated 24.02.2016 with validity upto 31.05.2018
j. MPCB granted consent to operate for Dry Coke Plant vide letter no. Format 1.0/BO/CAC-Cell/EIC No.KP-14106-13/23rd CAC/CAC-4228 dated 05.05.2014 with validity upto 30.06.2017
k. MPCB granted consent to operate for Coke, Tar and Coke Oven Gas Recovery vide letter no. Format 1.0/BO/CAC-Cell/EIC No.RD-3105-15/CAC-2736 dated 24.02.2016 with validity upto 31.05.2017
l. MPCB granted consent to operate for Pellet Production vide letter no. Format 1.0/BO/CAC-Cell/EIC No.RD-3100-15/CAC/CAC-11087 dated 21.08.2014 with validity upto 30.06.2018

4. Uploading of compliance on web site:

With regard to uploading of EC and compliance of conditions along with analytical reports on the web site of the company, PA did not upload the copies of EC, latest compliance report, analytical reports in company website.

A. Suresh/Cum 04/10/17
Scientist 'D'
सुरेश कुमार अडेपा
SURESH KUMAR ADAPA
वैज्ञानिक 'डी'
SCIENTIST 'D'
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest & Climate Change
क्षेत्रीय कार्यालय (पश्चिम मध्य क्षेत्र)
Regional Office (WCZ)
नागपुर/Nagpur-440001

ANNEXURE-1

COMPLIANCE OF FILE No. J-11011/76/2013-IAII (I) DATED 25th AUGUST 2015

Sub: Expansion of Integrated Steel Plant from 5 MTPA to 10 MTPA and Power Plant from 300 MW to 600 MW (Gas Based) of M/s JSW Steel Limited at Geethapuram, Village Dolvi, Tehsil Pen, District Raigarh in Maharashtra -Environmental Clearance - Regarding

Ref: Environmental Clearance from MoEF&CC, New Delhi, File No J-11011/76/2013-IAII (I) dated 25th August 2015

The production facilities after the expansion are given below:

(Expansion of JSWSL (existing 5 MTPA to 10 MTPA))

Sl. No.	Technological Facility	Units / Facilities (EC accorded) under 5 MTPA	Proposed facilities under 5 to 10 MTPA	Total Plant Capacity At 10 MTPA	Remark for facilities under 5 to 10 MTPA
1.	DR1 (Gas based Mega Module)	2.0 MTPA (by augmentation)	2.0 MTPA	4.0 MTPA	Work yet to start
2.	Pellet Plant	4.0 MTPA	4.0 MTPA	8.0 MTPA	Work yet to start
3.	Coke Ovens including By-product plant	2.0 MTPA	2.5 MTPA	4.5 MTPA	Work yet to start
4.	Sinter Plant	2.8+3.2 MTPA	8.0 MTPA	14.0 MTPA	Work yet to start
5.	Blast Furnace including Pig casting	3.6 MTPA by modification of existing Blast Furnace	4.5 MTPA	8.1 MTPA	Work yet to start
6.	SMS (CONARC)	5.2 MTPA (By Augmenting the existing facilities)		5.2 MTPA	NA
7.	SMS -BOF	-	6.0 MTPA	6.0 MTPA	Work yet to start
8.	Ladle Furnace(LF)	2x200t +205t	2X300t	2x200t +205t 2X300t	Work yet to start
9.	VD/VOD & RH-TP	1x200t+1x205t	2x300t	1x200t +1x205t 2x300t	Work yet to start
10.	CSP(HRC Coil) Thin Caster-cum-Hot Strip Finishing Train	3.5 MTPA (By Augmenting)		3.5 MTPA	NA

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11.	Conventional Slab Caster	2x1 strands (3.68 MTPA)	2x2 strands (5.72 MTPA)	Total 6 strands (9.4 MTPA)	Work yet to start
12.	Billet Caster	-	1x6 Strands	6 strands (1.5 MTPA)	Completed
13.	Plate Mill	1.5 MTPA	-	1.5 MTPA	Work yet to start
14.	CRM (Hot Rolled Skin Pass + Cold Rolled Full Hard Coil + Hot Rolled Pickled & Oiled Coil)	1.0 MTPA	1.5 MTPA	2.5 MTPA	Work yet to start
15.	Galvanizing Line (Cold Rolled Steel Strips, Hot Dip Zinc Coated Full Hard)	0.6 MTPA		0.6 MTPA	Work yet to start
16.	Electrical Steel CRGO line	0.4 MTPA	-	0.4 MTPA	Work yet to start
17.	Tin Plate Mill	0.4 MTPA	-	0.4 MTPA	Work yet to start
18.	Colour Coating Plant	0.5 MTPA	-	0.5 MTPA	Work yet to start
19.	Lime/Dolo Plant	1800 TPD	1800 TPD	3600 TPD	Work yet to start
20.	Oxygen Plant	4100 TPD	3500 TPD	7600 TPD	Work yet to start
21.	Hot Rolling Mill with shearing & slitting line	-	5.0 MTPA	5.0 MTPA	Work yet to start
22.	Bar Mill	-	1.4 MTPA	1.4 MTPA	Completed
23.	Slag & Clinker Grinding Unit	"	10 MTPA	10 MTPA	Work yet to start
24.	Captive Power Plant	300 MW	300 MW	600 MW (based on surplus gases of BF & Coke Oven)+RLNG	Work yet to start
25.	Township	-	150 acres	150 acres	Work yet to start

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ANNEXURE-2

Annexure 2

JSW STEEL LIMITED,

DOLVI, TALUKA – PEN, RAIGAD DISTRICT, MAHARASHTRA - 402107

Plant wise Air and water pollution control systems installed are as given below:

S. No	Plant	Pollution Control System Provided
1	Sponge Iron Plant (2 MTPA)	**Air Pollution Control Systems** • Furnace dust collection systems – Cyclone with Venturi Scrubber • Product screen - Venturi Scrubber • Product silo– Cyclone with Venturi scrubbers • Dust suppression through water sprinkling on roads. • DE system (Wet Scrubber) for Product conveyor (C 304), Remet Conveyor (C303) & Product Screen **Water Pollution Control Systems** • WWTP - Clarifier, Classifier, Thickener, High Rate Thickener, Cooling Towers, Sludge Pond. Treated water is reused in Process and EAF Slag Cooling.
2	Hot Strip Mill (3 MTPA)	**Air Pollution Control Systems** • EAF 1 & 2 - Gas Cleaning Plant I – Bag Filters • EAF 3 & 4 - Gas Cleaning Plants II – Bag Filters • Secondary emissions - Gas Cleaning Plant III – Bag Filters • Lime, Coke storage silo– Bag Filter, • DRI silo- Venturi Scrubber • LF I & II – Super Suckers. • High Temperature Quenching (HTQ) tower (4 Nos) to improve the efficiency of exiting GCPs I & II. **Water Pollution Control Systems** • WWTP – Scale Pits, Thickener, Pressure Sand Filters, Flash Mixer, Sludge Drying Bed, Cooling Towers. Treated water is reused in Process and EAF Slag Cooling.
3	Blast Furnace (3.5 MTPA)	**Air Pollution Control Systems** • Stock house de-dusting systems (2 Nos)- Bag Filter • Cast House Fume Extraction (2 Nos)- Bag filters and Reverse Air Bag House & ESP • Dust catcher with cyclone & GCP wet scrubbing • Treated Blast Furnace Gas is being utilized for Power generation in TRT and 55 MW Captive Power Plant. **Water Pollution Control Systems**

		• Gas Cleaning Plant WWTP – Washers, Thickener, Vacuum Drum Filters, Cooling Tower. Treated water is reused in Process.
4	**Lime Calcination Plant (Kiln I & II- 300 TPD each and Kiln III- 600 TPD)**	**Air Pollution Control Systems** • Waste Gas Cleaning Plant in Kiln I, II & III – Bag Filters • Lime Stone Handling Area – Bag Filters (2 Nos) • Lime Handling Area – Bag Filter (2 Nos) • Product unloading area - Telescopic chutes to closed tankers. **Water Pollution Control Systems** No waste water generated in the process.
5	**Sinter Plant - I (2.8 MTPA)**	**Air Pollution Control Systems** • Coke Handling - De-Dusting System - Bag Filter • Sinter machine - ESP • Flux handling – ESP • Proportioning House- ESP • Sinter Sizing and Screening area - ESP • Sinter Discharge End - ESP • Water sprinklers in Hammer crusher & Flux screen • Pneumatic loading of lime from closed tankers. • DE1- Waste Recycling Secondary Material – (Bag Filter) • DE2- R2 tail end Return fines – (Bag Filter) • DE3 – Product Sinter conveyor (BC 57) – (Bag Filter) **Water Pollution Control Systems** No waste water generated in the process.
6	**55 MW Captive Power Plant**	**Air Pollution Control Systems** Gas based. Stack height- , Low NOx burners **Water Pollution Control Systems** WWTP with Cooling tower, Sand Filters. Cooling tower blow-down is used for Dust Suppression and Slag Cooling.
7	**Raw material handling Area**	**Air Pollution Control Systems** Dust Suppression Systems in Junction houses and yards and water sprinkling through Rain Guns on stock pile. Covered shed being constructed. **Water Pollution Control Systems** No waste water generated in the process.
9	**Sinter Plant II (2.5 MTPA)**	**Air Pollution Control Systems** • Sinter machine- ESP • Material handling- Bag filters (7 Nos) at Flux & fuel

		crusher, Flux & fuel Screen, Sinter Screen, Sinter HL-FS & Crusher, Sinter fines Bunker, Fuel & Flux Storage buildings • Junction Houses J1 to J11- Bag filters. **Water Pollution Control Systems** • No waste water generated in the process.
10	**Coke Oven Plant (1 MTPA) – Under Amba River Coke Ltd.**	**Air Pollution Control Systems** • De-dusting systems in Coal Route at Silo, Primary crusher, & Secondary Crusher – Bag Filters • De-dusting systems at in coke route at Coke Cutter & Screen House – Bag Filters • De-dusting system with Bag filters at Coal charging and pushing at batteries • Charge Gas Transfer car with high pressure liquor ammonia to control the charging emissions. • De-sulphurisation unit to recover elemental sulphur from Coke Oven gas. • Treated Coke Oven Gas is being utilized in Sponge Iron Plant, Coke Oven Battery and Tunnel Furnace. **Water Pollution Control Systems** ETP- Biological Oxidation Dephenolization (BOD) plant with oil separator, sedimentation, Anoxic Pool, Anaerobic pool, Aerobic pool. Treated Effluent is recycled for coke quenching.
11	**Pellet Plant 4 MTPA – Under Amba River Coke Ltd.**	**Air Pollution Control Systems** • Process - ESP • Blending & Mixing area - De-dusting system – Bag Filter • Additive mill area - De-dusting system – Bag Filter • Hearth Layer - De-dusting system – Bag Filter • Product Storage area - De-dusting system – Bag Filter **Water Pollution Control Systems** No waste water generated in the process.
12	**Domestic waste water**	STP- 3 Nos. Treated waste water is used for plantation purpose.

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ANNEXURE-3

Environment Policy

JSW Steel recognizes nurturing the environment as its prime responsibility for long-term sustainability in and around its areas of operation.

We are committed to :

- Addressing the issue of climate change through efficient use of natural resources, minimization of wastes and developing new grades of steel with low environmental impact
- Continual evaluation of environmental impact of its operations and adoption of appropriate technologies and practices to mitigate adverse effects
- Effective implementation of Environmental Management System for continual improvement
- Deploying necessary resources to comply with applicable environmental laws, regulations and agreements
- Enhancing awareness, skills and competencies amongst its employees, associates, suppliers and community to create an eco-friendly society
- Environmental conservation initiatives and preservation of bio-diversity around the areas of our operation

Date: 20th May 2016

Partha Sengupta
President (Dolvi & Salav)

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JSW Steel Limited, Dolvi Works

ANNEXURE-4

Annexure- 11

Public Hearing Compliance
For expansion of steel plant from 5 to 10 MTPA

Public hearing was cconducted on 28.01.2014 at Pen Education Society's Jaikisan Vidya Mandir and Higher Medium school at Wadhkal, Taluk. Pen, Dist. Raigad, Maharashtra. All points raised during the public hearing are being attended with a proper action plan. The compliance status is as given below.

S. No	Issues	Action Plan / Action Taken
1	**Technology**	
a.	Measures for pollution / environmental control	The levels of air quality, Noise Level and water pollution of existing projects are well within norms. Maharashtra Pollution Control Board (MPCB) also checks the ambient air quality and water pollution and takes regular samples of the same. Adequate Air pollution control systems like De-dusting systems with Bag Filter, venture Scrubber, ESPS have been installed and are in regular operation. Plant wise effluent Treatment plants provided and the treated effluent is reused in process. For treatment of domestic effluent, STPs provided and the treated effluent is used for gardening. The on line ambient air quality monitoring system and continuous stack emissions monitoring systems are provided and the data is connected with MPCB and CPCB servers. For existing plants, we have spent more than Rs 480 crores on Environmental control measures.
b.	Information on Gas Holder installed in the Project.	For existing Coke Oven plant, Gas Holder is installed in Coke as per the details below. Gas holder height - 61.8 Meters Diameter of gas holder - 37.8 Meters Volume - 50,000 m^3
2	**Infrastructure Development**	
a.	Further development of infrastructure in terms of water supply scheme etc. in the neighboring area.	Presently water supply schemes are provided at 45 villages. Rs 16 Crores has been spent on laying new pipeline for supply of drinking water to nearby villages for 2016-17. Rs. 3.6 Crores spent on free drinking water supply to neighboring villages (45 villages). Rs 3.05 crores spent on development of Rural Drainages and provision of home for Destitute families and tribal people in 2015 to 2017. Rs 22 Lacs spent on Sanitation in rural villages, for construction of drainages, toilets in 2015-16.

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b.	Repair of roads in the area	We have undertaken the work of construction of road in the village Dolvi, Gadab through our Community Development work. Repairing of State Highway from our Main gate to Wadkhal naka & from NH-17 Gate to Wadkhal done.
	Immediate action to manage increased road traffic	Transportation of almost all raw material is being done through the sea route from our captive jetty. The dispatch of finished products is being made through Rail. By this, we have been able to control the traffic movement by road. We have also developed a Parking Plaza in 5 acres of land to avoid heavy traffic on the road. We have deployed security persons to regulate our vehicles.
3	**Education/Training**	
a.	Setting up of institutes of higher education such as a Degree Engineering College.	We have undertaken various CSR programs to develop and upgrade the educational quality of the area. We have constructed the school building at village Wadkhal, Shahabaj, Gadab. We have also constructed Toilets Blocks in the Primary School & High schools. Activities like distribution of Note books, Uniforms, School benches has also been undertaken. We have a proposal to establish an Engineering Collage under the Pen Educational Society at Wadkhal. In the last two years 2015 to 2017, Rs 1.83 Crores has been spent on Infrastructure and development of formal Educational institutions and vocational educational institutions.
b.	Poor arrangement for village candidates sent for training in Bellary.	All candidates are provided accommodation at Bellary township including food & transport facilities. Proper arrangement for the trainee candidates are being made.
4	**Employment opportunities**	
a.	More employment to locals.	The company has given commitment to give priority to local candidates in direct & indirect employment. Accordingly, priority in employment is being given to candidates from local villages.
b.	Details of 5000 jobs to be generated by the expansion project.	The requirement of manpower for the proposed new facilities has been estimated to be 5000. It covers the top management; middle and junior level executives and other supporting staff. It is proposed to outsource non-core area of operations to the out sourced agencies as practiced in the existing plant.

c	Regularization of contract laborers working in the project.	The company is following all rules & regulations for the regularization of Contract Labours working in the project. We are following all terms & condition of Contract Labour Act. More emphasis has been given to all employees on safety & security aspects.
5	**Health care & medical facilities**	
	Setting up of a hospital/ common medical facility center in the neighboring area.	Civil work has been started for the proposed 124 bedded super specialty hospital which will be a common medical facility center for the neighboring villages, one of its only hospital in the whole district. Rs 68 Crores have been allocated to develop the hospital at village Wadkhal. Rs 76.11 lacs has been spent on Conducting Health camps and Preventive Health check-up camp-E-Health profile for last two years (2015-16 & 2016-17).
6	**Environmental pollution**	
a.	Immediate action for waste water management.	Presently at 5 MTPA stage, complete waste water generated is treated, recycled and reused for slag cooling and plantation purpose. Zero effluent discharge is being maintained. At 5 to 10 MTPA expansion also the waste water shall be treated and recycled and reused for slag cooling and plantation. Water Pollution Control Measures: ETP for trade effluent and STP for domestic effluent.
b.	Immediate action for material handling at Jetty	At Jetty maximum raw materials are transported from barges through conveyors. The raw material transfer points at Jetty have been operating with dust suppression system. Entire conveyer system from Jetty to plant is closed system to avoid spillage as well as to control fugitive emissions. Covered storage of raw material has been provided.
7	**Greenery & Tree Plantation**	
	Tree plantation in nearby villages	Mass plantation drive for a target of One Million tree plantation in and outside the premises in nearby villages is being carried out. We have entered into a tripartite agreement with an NGO – TERRE of Pune for plantation. Programs for making people aware of importance of plantation is being done through Gram-Panchayat. Rs 8.85 lacs spent for plantation in nearby villages.
8	**Others**	
a.	Certificates should be issued to land owners who gave their land in 1992 for the project	In the year 1992, land area of 600 acres had been acquired for the project. Most of the employees are from the local villages. All lands are purchased through proper papers, documentation under the State Government rules. Hence, there is no need to issue the certificate to the land owner.

b.	Compensation to be paid to farmers.	Compensation to the farmers for the loss of their crops has been paid in time. There is no dispute of any farmer regarding compensation.

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JSW Steel Dolvi- Details of Continuous Stack Emission Monitoring System, JSW Steel Ltd., Dolvi Works (Maharashtra)

S. No.	Plant	Stack Name where Online CEMS installed	Instrument supplier
1	Sponge Iron Plant - 2.0 MTPA	Flue Gas Ejector Stack	M/s. Adage Automation Pvt. Ltd. A2 Taloja Industrial Area, Taloja MIDC– 410208 Maharastra , INDIA
		Furnace Dust Collection System	
		Product Screen Dust Collection System I	
		Product Screen Dust Collection System II	
		Product Silo Dust Collection System	
2	Captive Power Plant - 55 MW	55 MW Captive Power Plant	
3	Coke Oven Plant - 1.0 MTPA	Main Stack	
4	SMS- Hot Strip Mill Plant - 3.0 MTPA	Gas Cleaning Plant I	M/s.Chemtrols Industries Limited, Amar Hill, Saki Vihar Road, Powai, Mumbai - 400 072 Tel: (+91-22) 67151 207, 9987784940 Fax: (+91-22) 2857 1913 Website:www.chemtrols.com
		Gas Cleaning Plant II	
5	Lime Calcination Plant - 0.44 MTPA	Kiln I	
		Kiln II	
		Kiln III	
6	Sinter Plant - I - 2.8 MTPA	Main ESP	
7	Blast Furnace Plant - 3.5 MTPA	Stove	
8	Pellet Plant - 4.0 MTPA	Main ESP	
9	Sinter Plant - II - 2.5 MTPA	Main ESP	
10	Billet Caster - 1.5 MTPA	LF & Caster Fume Extraction System	
11	Bar Mill - 1.4 MTPA	Bar Mill	

These CEMS are interlinked with CPCB / MPCB.

ONLINE AMBIENT AIR QUALITY MONITORING STATIONS

5 nos. of On Line Ambient Air Quality Monitoring Stations at five different locations at plant boundary within the premises is installed in consultation with MPCB for the parameters PM2.5, PM10, SO2, NOx, CO & data interlinked with CPCB / MPCB.

1. Near MSEB Sub Station - System Supplied M/s. Thermo Fisher Scientific India Pvt. Ltd.
2. Near Kasumata Temple- System Supplied M/s. Thermo Fisher Scientific India Pvt. Ltd.
3. Near Coke Oven- System Supplied by M/s. Environment SA, France
4. Near Goa Gate- System Supplied by M/s. Environment SA, France
5. Near Dolvi Village- System Supplied by M/s. Environment SA, France

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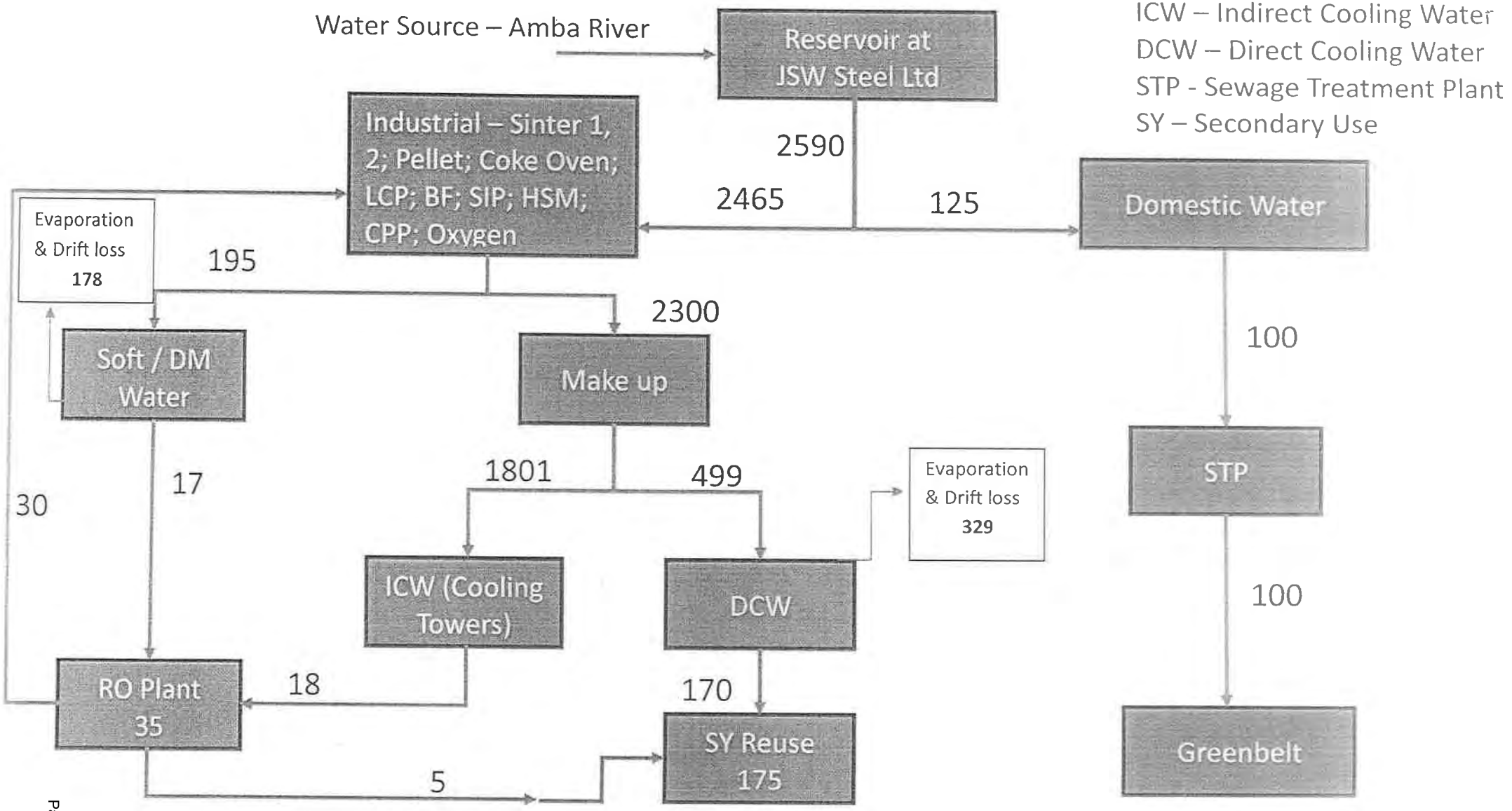
Water Balance - JSW Steel Ltd - Dolvi at 5 MTPA stage

Annexure 5

ICW – Indirect Cooling Water
DCW – Direct Cooling Water
STP - Sewage Treatment Plant
SY – Secondary Use



All values are in m^3/hr

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Annexure 6

8. JSW Steel Ltd, Dolvi- Slag utilisation details of 2015-16, 2016-17

Sr. No	Year	Type of Slag	Quantity of Slag	Disposal
1	FY 2015-16	EAF & LF Slag	532826	Using as Raw Material in EAF, Sinter Plant after metallic separation, Internal road making, Land filling.
		BF Slag	381825	Converted in to granules in Slag Granulation Plant & used in cement plant for cement making.
2	FY 2016-17	EAF & LF Slag	913938	Using as Raw Material in EAF, Sinter Plant after metallic separation, Internal road making, Land filling.
		BF Slag	1036076	Converted in to granules in Slag Granulation Plant & used in cement plant for cement making.

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Annexure- 9

JSW Steel Ltd, Dolvi – Corporate Social Responsibility – 2016-17

S. N	Activity	Expenses 2016-17 (in lakhs)
A	**Improving Living Conditions** • Preventive Health Checkup program for farmers & fishermen family • Water pipe line for drinking water supply to villages • E-health profile for villagers.	1681.47
B	**Education** • E-learning project for primary schools • E Learning Vithallwadi, Kolad & Kamarli (2 Units) • Training & Capacity Building	60.82
C	**Promotion/ Training SHG's** • Tailoring & catering classes for selected 200 women in Masadbedi, Borve, Shirki, Thakurbedi • Jute bags making training to SHGs • Soil & Water testing Training to women in Villages	8.12
D	**Environment Awareness & Plantation** • Tree Plantation at Village Masad on the occasion of "Krushi Divas"	6.42
E	**Conservation of mangroves** • Preparation of mangroves nursery in jute pots (with SHGs) • Mangrove Plantation on selected patches • Mangroves Interpretation Centre • Video Documentary for complete project • Expert fees ,Airfare • Cost of Community Organizers	115.56
F	**Sports**	0.70
G	**Rural Development** • High yield salt tolerant paddy cultivation program • Composite Farming (Fish cum Duckery, vegetable, fruit orchard, coconut) • Water storage pond for villagers ,Thakurbedi • Construction of pond gate & feed stacking room pond for fisherman at Janavali village • Pond cleaning at Masad, Benvale • Home based Poultry farming • Cement concrete road at Masadbedi, Sarebag • Construction of Bus stop (Masad budruk) • Providing Solar Lamps at Tamasi, Bandar, Shirki Chal 1 & 2 , Masad Bede (Street light 40 lamps) • Providing Solar Lamps at Bhal, Vithalwadi & Rtankotha (20 lamps) • Construction of Sakav - 3 Units • Repairing work of small jetty at Tamshi bandar	265.58
	Total	2138.67

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Annexure- 8(i)

JSW Steel Ltd., Dolvi – Environment Expenditure for 2016-17

No	Environment Expenditure	Total 2016-17 (in Lakhs)
1	Environment Improvement Projects – CAPEX -Dust Extraction system at RMHS, SIP, Pellet Plant -Pneumatic conveying system for dust at SIP and Pellet Plant -Covered shed for secondary waste material at SP1 -Telescopic chute and Bulkers for dust handling at SMS -Roll Cutting DE System -Procurement of Water Sprinklers -Procurement of Road Sweeping M/c -Internal roads, paving, concreting, green cover -Rain water harvesting structures -Sludge treatment at CSP, HSM -Pollution control equipment at Sinter Plant 2, 1000 TPD Oxygen plant	9150
2	Operation and Maintenance of Water Treatment Plants in SIP, HSM, BF, Canteen Waste, STP and Billet Bar Mill	152.87
3	Treatment and disposal of waste - solid wastes	3577.28
4	Depreciation and maintenance cost of equipment used in pollution control	17223.117
5	Expenditures for the purchase and use of emissions certificates – Licenses, Certificates	258.22
6	Water Cess charges paid to MPCB	8.73
7	O&M cost for laboratory equipment	31.77
8	Insurance for environmental liability	1.05
9	O&M cost of Road Sweeping machine and Water Sprinklers	95.46
10	Environment Awareness programs	7.0
11	1) AMC for Online AAQMS 2) Third party Environmental monitoring by MOEF&CC approved Lab + Other Testing charges 3) Joint Vigilance Sampling charges to MPCB	16.55 36.06 0.66
12	Annual Cost for ISO 14001 Certificate	2.5
14	Tree Plantation, Gardening and Green house development	423.05
	Total	**30984**

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Annexure- 8(ii)

JSW Steel Ltd., Dolvi – Environment Expenditure for 2015-16

No	Environment Expenditure	Total 2015-16 (in Lakhs)
1	Environment Improvement Projects – CAPEX -Wind Shield -Dust suppression system at JHs -Separate COG Line for Coke Oven End Flue Verticals -Industrial Vacuum Cleaning system at LCP -Installation of telescopic chutes at LCP -Installation of C304 DE System in SIP -Installation of Cast House and Stock House DE System in BF -Installation of HTQ systems in SMS to improve the efficiency of existing DE System -Improve suction efficiency of LF 1&2 and Torpedo re-ladling area by replacement of Booster Fan, Motor, Ducting at SMS -Procurement of Water Sprinklers -Procurement of Road Sweeping Machine -Online stack emission monitoring system	11930
2	Treatment and disposal of waste	2110.28
3	Depreciation and maintenance cost of equipment used in pollution control	10357.74
4	External services for environmental management -Drinking water testing -Joint vigilance sampling by MPCB. -AMC for on line Ambient air quality system -Software installation from external agencies -Calibration of equipment -Chemicals, Consumables, and equipment	65.66
5	-Rain Water Harvesting Study -Consultancy Fee for MECON	5.47
6	Water cess to MPCB	5.35
7	Annual costs of ISO 14001 certifications	2.0
8	Expenses on Horticulture	245.80
9	License- Consent Fees	247.79
Total		**24970**

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Annexure- 12

JSW STEEL LIMITED,

COMPLIANCE STATUS OF CHARTER ON CORPORATE RESPONSIBILITY FOR ENVIRONMENT PROTECTION FOR INTEGRATED IRON AND STEEL INDUSTRY AT JSW STEEL LTD., DOLVI WORKS.

S. No	Issues	Status	Target
1	Coke Oven Plants: - To meet the parameters PLD (% leaking colors), 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 PER Chart along with the Bank Guarantee for the implementation or the time. - To rebuild at least 40% of the coke oven batteries in next 10 years (by Dec 2012.)	The coke oven plant has been established in 2014, hence rebuilding of batteries is presently not applicable to the new batteries. • PLD, PLL and PLO are well within the Norms prescribed.	Complied.
2	Steel Melting Shop: Fugitive emission from SMS • To reduce 30 % by March 2004. • To reduce 100 % by March 2008. (Installation of secondary de-dusting system).	In SMS, the fugitive emissions are well within the prescribed Norms. Following measures have been taken to control fugitive emissions in SMS- • Gas Cleaning Plants 1 & 2 having both primary de-dusting systems at EAF shells followed by High Temperature Quenching Towers (HTQ) and bag filters and secondary fumes extraction system followed by bag filters. • Gas Cleaning Plant 3 with Bag filters is Secondary de-dusting system with canopy hood at the roof top to capture secondary fumes to control roof top emissions. • De-dusting system with bag filters has been installed to control dust during material handling	Complied
3	Blast Furnace: Direct inject of reducing agents by June 2013.	Coal Injection Plant for direct injection of pulverized coal in furnace has been implemented. Present rate of CDI in our Blast Furnace is 145 Kg/THM.	Complied

4 (a)	Solid Waste / Hazardous Waste Management: Utilization of SMS / BF Slag: · By 2004: 70 % · By 2006: 80 % · By 2007: 100 %	BF Slag- 100% utilized in Cement plant. EAF slag- 7% is utilized in Sinter plant and balance is utilized for construction activities for expansion projects by land filling in the low lying areas and is also being used for internal road making. Further use in road making and construction activities is being explored.	Complied
4 (b)	Hazardous Wastes: Charge of tar sludge / ETP sludge to Coke Oven by June 2003. Inventorization of the Hazardous Waste as per hazardous Waste (M&H) Rules 1989 as amended in 2000 and implementation of the Rules by December 2003. (Tar sludge, acid sludge, waste lubricating oil and type fuel falls in the Category of Hazardous Waste)	• Tar Sludge is reused in the Coke oven process. • Inventorization of the Hazardous Waste as per hazardous Waste (M&H) Rules 1989 as amended thereof has been done and is being implemented. • We do not have Acid sludge in our plant. • Waste lubricating oil (Used/Spent oil) is and Sulphur paste is sold to CPCB / MPCB authorized parties for recycling. • Form No 10 and Form 4 are regularly submitted to State Pollution Control Board.	Complied
5	Water Conservation / Water Pollution. To reduce specific water consumption to 5 m3/T for long products and 8 m3/t for flat products by December 2005. To operate the CO-BP effluent treatment plant efficiently to achieve the notified effluent discharge standards, by July 2003.	The specific water consumption for the year 2016-17 was 3.38 m3/t of crude steel which is well below the targets for flat products and as well as for long products. The Coke Oven By-product effluent treatment plant (BOD) is operating efficiently and all the parameters are well within the prescribed standards.	Complied
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.	Installed 22 Nos Online Stack Monitoring System on major stacks and 5 Nos Online Ambient Air Quality Monitoring System and the data is interlinked with MPCB and CPCB server.	Complied
7	To operate the existing pollution control equipment efficiently and to keep proper record of run hours, failure time and efficiency with	• We are operating existing pollution control equipment efficiently. • Compliance report is submitted to CPCB on monthly basis.	Complied. Complied

	immediate effect. Compliance report in this regard be submitted to CPCB / SPCB every three months.		
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		
I	Energy recovery of top Blast Furnace Gas	• Power generation through TRT by using top pressure of BF gas.	Completed
II	Use of Tar – free runner linings.	We are using low cement castable runner lining in BF plant.	Complied.
III	De-dusting of Cast house at tap holes, runners, skimmers ladle and Charging points.	We have provided Cast House Fume extraction system inclusive of tap holes, runners, skimmers, ladle and charging points to control Fugitive emissions from Blast Furnace.	Complied
IV	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.	Since our facility is far away from mining site it is not feasible to fill slag back to the abandoned mines. 100% slag is being utilized. We are not generating any fly ash from our plant.	Not Applicable.
V	Processing of the waste containing flux and ferrous wastes through waste recycling plant.	All secondary waste is being used in the Sinter plant for production of Sinter.	Complied.
VI	To implement rain water Harvesting	Roof top rain water collection & harvesting system is installed at 12 major buildings.	Complied
VII	Reduction of Green House Gases by • Reduction in power consumption. • Use of by-products gases for power generation. • Promotion of Energy Optimization Technology including energy audit.	It is on going process. Power generation through TRT by using top pressure of BF gas. Installed 55MW Captive power plant (Blast Furnace Gas Based). Use of Sinter waste gas for Steam generation (4-6 T/Hr). Use of Sponge Iron Plant (SIP) furnace waste gas for preheating of gases (Reforming). Coke Oven gas is used as fuel in SIP and Tunnel Furnace of HSM.	Completed

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3 35

VIII	To set targets for Resource Conservation such as Raw material, energy and water consumption to match International Standards.	We have our internal benchmark for Raw material, Energy and Water consumption, which we being compared with International benchmark.	Complied
IX	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.	We have full-fledged Environmental Monitoring Laboratory with trained personnel.	Complied
X	To improve overall housekeeping.	• Maintaining good housekeeping inside the plant premises.	Complied
10	**Sponge Iron Plants:** 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.	• We have a Gas based Sponge Iron Plant with inbuilt Air and Water Pollution control systems. • Environmental parameters are within the prescribed norms.	Complied

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Annexure -13

Ref No.

Date: 04/09/2017

TOWHOMSOEVER IT MAY CONCERN

Court cases pending against JSW Steel Ltd, Dolvi till date.

1) PIL 102/2014 at Bombay High Court – Ongoing
2) Application 122/2015 at NGT, Pune – Ongoing
3) Appeal 59/2015 at NGT, Pune – Case is tagged up with the PIL
4) Appeal 30/2016 at NGT, Pune – Dismissed in favour of JSW Steel Ltd, Dolvi

Signature:

Designation: Jt. CEO

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JSW STEEL LIMITED

DOLVI WORKS, MAHARASHTRA

FEASIBILITY REPORT
FOR
PELLET PLANT #2 COMPLEX

MECON LIMITED
RANCHI – 834002

NO. 11.02.Q7GK.FR.PP.2018 **JULY, 2018**

JSW STEEL LIMITED

DOLVI WORKS, MAHARASHTRA

FEASIBILITY REPORT

FOR

PELLET PLANT #2 COMPLEX

MECON LIMITED
RANCHI – 834002

Rev. No.	Date	Prepared By	Checked By	Approved By
0	04.07.2018			
		Kunal Singh Manager & PC	S. Brahma DGM	S. K. Bhattacherjee Jt. GM

CONTENT

LIST OF DRAWINGS

SL. NO.	DRAWING NO.	DESCRIPTION
1	MEC/11/02/Q7GK/FR/PP/01	LAYOUT OF PELLET PLANT
2	MEC/11/02/ Q7GK/FR/PP/02	PROCESS FLOW SHEET
3	MEC/11/E1/ Q7GK/FR/PP/03	ELECTRICAL SINGLE LINE DIAGRAM
4	MEC/11/PY/Q7GK/FR/PP/04	PROJECT IMPLEMENTATION SCHEDULE

1. INTRODUCTION

1.1 Background

JSW Steel Limited (JSW), Dolvi Works intends to install one 816 m^2 Pellet Plant #2 at Dolvi, Raigad, Maharashtra near its existing Pellet Plant #1.

Accordingly, JSW has entrusted MECON for preparation of Feasibility Report (FR) for the proposed Pellet Plant #2.

1.2 Scope of this Report

The broad scope of this FR is as follows:

- From receipt of iron ore fines (pellet grade) on one reversible conveyor at top of Day bins for wet grinding unit; limestone, dolomite, coke & bentonite by truck at coarse additive ground storage unit of proposed pellet plant,
- Upto discharge of finished pellets from pellet storage bins onto two numbers Client's conveyors coming out from the pellet storage unit,
- Technological Layout,
- Process flow sheet,
- Raw material linkages,
- Raw material requirement,
- Requirement of auxiliary & services facilities like power, water, fuel gas, compressed air etc.,
- Manpower estimate,
- Implementation schedule.

1.3 Acknowledgement

MECON is very much thankful to JSW Management for assigning the job of preparation of FR and places on record its appreciation for

valuable assistance/ co-operation rendered by them towards preparation of this report.

2. OPERATING REGIME

The proposed pellet plant will be operating on the basis of three shifts a day and 350 days in a year after taking into consideration the shutdowns required for the planned maintenance and unscheduled breakdowns.

The break-up of the planned maintenance and unscheduled stoppage & shut down of the plant are as indicated below.

Sl. No.	Item	Duration in Days / Year
1.	Capital repairs (once in a year)	6
2.	Scheduled repairs (once in a month) (12 hours / month)	6
3.	Unscheduled stoppage and shut downs	3
	Total	**15**

2.1 Quality of Raw materials

The quality of input raw materials (as provided by Client) used for pellet production is furnished below in Table -2.1.

Table –2.1

Chemical analysis of raw materials

Raw mat.	Quality (%)					
	Fe(t)	SiO_2	Al_2O_3	CaO	MgO	LOI
IOF	66.9	2.75	0.5	0.15	0.13	0.57
Limestone	0.5	1.5	0.3	53.5	2.5	40
Dolomite	0.2	0.4	0	32.5	17.5	40
Bentonite	8	52.5	16	1.5	1.5	15.5

Proximate analysis of Coke (as provided by Client) is as furnished below:

Fixed carbon (total)	82 to 88 %
LHV	7200 kcal/ kg
Moisture	Max. 15 %
Ash	Max. 18 %
Volatile matter	3.5 %

2.2 Material balance

The indicative material balance for production of 9.0 MTPA high basicity pellets has been placed at Table - 2.2.

Table - 2.2

Material Balance for production of pellets, (net and dry)

INPUT				OUTPUT			
Material	**%**	**t/h**	**t/yr**	**Material**	**%**	**t/h**	**t/yr**
IOC	59.61	1076.84	8528614	Pellets	63.00	1136.36	9000000
Coke	0.66	11.93	94500	Hearth layer	25.00	451.63	3576915
Bentonite	0.31	5.68	45000	Losses	12.00	218.53	1730744
Dolomite	1.89	34.09	270000				
Limestone	3.53	63.76	504941				
Water	9.00	162.59	1287689				
Hearth layer	25.00	451.63	3576915				
Total	**100.00**	**1806.52**	**14307659**		**100.00**	**1806.52**	**14307659**

2.3 Quality of product pellets

Based on the raw material analyses as per Table -2.1, the expected chemical composition of pellets is furnished below in Table -2.3.

Table - 2.3

Quality of pellets

Constituents	Value (%)
Fe (t)	63.48
SiO_2	3.07
Al_2O_3	0.62
CaO	4.13
MgO	0.8
Basicity (CaO / SiO_2)	1.3

The expected mechanical and metallurgical properties of finished pellets are placed at Table -2.4.

Table -2.4

Expected mechanical & metallurgical properties of indurated pellets

Sl. No.	Item	Value
i)	Size 9 to 16 mm + 16 mm	92 % 5 % max.
ii)	Porosity	25 % min.
iii)	Cold crushing strength	>= 250 kg/ pellet
iv)	Tumble index (+6.3 mm)	92 % min.
v)	Abrasion Index (-1 mm)	5 % max.
vi)	JIS swelling Index	20 % max.
vii)	JIS reducibility	65 % min.
viii)	Compression strength after reduction	30 kg/ pellet

However, the same shall be firmed up upon pot grate test.

2.4 Specific & Total consumption of raw materials & services

The indicative specific consumption of raw materials, fuel gas (mixed gas or Coke Oven gas), power and water for the proposed pellet plant is furnished in Table –2.5.

Table –2.5

Raw Material (Dry & Net), kg/ tonne of pellets

i.	Iron ore concentrate	950
ii.	Bentonite	5
iii.	Coke	11
iv.	Limestone	56.5
v.	Dolomite	30

Services (per tonne of pellets)

i.	Fuel gas Mixed gas (BF + CO), CV : 1860 kcal/ Nm^3 or Coke oven gas, CV : 4000 kcal/ Nm^3	166300 kcal
ii.	Make up water	0.2 m^3
iii.	Electric power	~ 47.2 kWh
iv.	Compressed air	32 Nm^3

Specific consumption of raw materials, fuel & power shall be firmed up through pelletising test work.

The indicative total consumption of raw materials, fuel gas (mixed gas or Coke Oven gas), power and water for the proposed pellet plant is furnished in Table –2.6.

Table –2.6

Raw Material (Dry & Net) (t/year)

i.	Iron ore concentrate	8550000
ii.	Bentonite	45000

iii.	Coke	99000
iv.	Limestone	508500
v.	Dolomite	270000

Services (per year)

i.	Fuel gas Mixed gas (BF + CO), CV : 1860 kcal/ Nm^3 or Coke oven gas, CV : 4000 kcal/ Nm^3	 804.7 x 10^6 Nm^3 374.2 x 10^6 Nm^3
ii.	Make up water	1.8 x 10^6 m^3
iii.	Electric power	~ 425 x 10^6 kWh
iv.	Compressed air	288 x 10^6 Nm^3

3. RAW MATERIAL LINKAGES

The raw material required for the proposed pellet plant #2 are iron ore fines, limestone, dolomite, coke and bentonite.

Sources of various raw materials are furnished below:

- **Iron ore fines**

  Superior quality iron ore fines (pellet feed) shall be received by conveyor from RMHS yard to day bins near wet grinding unit. Iron ore fines shall be sourced from Anglo American Mines at Brazil.

- **Limestone and dolomite**

  Limestone and dolomite will be sourced from Dubai for the proposed pellet plant.

- **Coke**

  Coke shall be imported from China for use in pellet plant.

  The following quality of coke (dry basis) is being considered for use in Pellet plant:

Ash	-	max. 18 %
Volatile matter	-	3.5 % (total)
Fixed carbon	-	82 – 88 % (total)

- **Bentonite**

  The Bentonite requirement of the proposed pellet plant will be met through purchase from mines in Gujarat. The bentonite deposits in Gujarat are sodium-based bentonite.

4. SITE & INFRASTRUCTURE FACILITY

4.1 Site and infrastructure

Location of Site

The proposed site for the pellet plant is situated at Dolvi, Raigad district of Maharashtra. The plant site is located at approximately 18°41'15.54" Latitude, 73° 1'47.46" Longitude.

The Location map of the site is shown in the location map & regional plan drawing no. MEC/11/14/Q7GK/001, R0.

Land and terrain

The land for proposed plant is already within the boundary wall of M/s JSW and total area available for the plant is approximately 33 acres. Land is almost flat having average altitude +3.5 m above MSL.

Road linkage

National Highway NH66 connecting Mumbai to Goa and state highway SH88 connecting Pen to Alibag are passing along the plant site on its east and north respectively. The plant site is connected to NH66 through Goa gate on the east and to SH88 at the North-west corner through Alibag gate.

Railway linkage

The nearest railway station to plant site is Pen under the Panvel-Roha section of Central railway. At present site is connected to Pen through single line connection.

Port

A captive riverine port-Dharamtar port located on the right bank of Amba river about 16 km from its mouth and operated by JSW infrastructure. The port is located North-West of the plant and at a distance of about 1 km from the Alibag gate.

Power

The source of power for proposed pellet plant is from MSEB grid only and will be received from MSEB substation, Nagothane to GIS inside Dolvi plant.

Water

Water will be made available by JSW near boundary of proposed pellet plant from their existing water source of Dolvi works. The existing water source is Nagothane River.

Meteorological Data

Wind
Predominant wind direction is Southwest to northeast.

Ambient Temperature

Highest Temperature:	42°C
Lowest Temperature:	9.4°C

Relative Humidity

During summer:	77 % avg.
During monsoon:	89%

Rainfall

Annual Rainfall:	2124.9 mm/yr. avg.
Annual Wind Speed:	3.7 m/s
Seismic Zone:	SZIV

4.2 General Layout & Transportation

Rationale for Layout

The layout of the proposed pellet plant has been developed keeping in view the following factors:

- Smooth and uninterrupted flow of materials in accordance with the technological requirement,
- Optimum lead for transport of material and for services lines,
- Logistic approach in location of technological units as well as services facilities.

Locations of Various Units

The relative location of various units has been shown in the layout drawing no. MEC/11/02/Q7GK/FR/PP/01.

It has been proposed to receive iron ore fines by belt conveyor and additives by road to the pellet plant. The location of raw material storage and handling facilities has been planned in west side to existing pellet plant to have smooth unloading and optimum conveyor length from storage yards to the day-bin building.

The location of pellet plant has been suitably planned in accordance with the technological requirements as well as dispatch of pellet product.

The location of services units and auxiliary facilities viz electrical substations, water supply facilities, compressed air facility etc. have been suitably finalised to meet the technological requirements.

A well-planned road network has been planned to cater to the needs of various plant units and auxiliary services.

Salient Features of the Layout

The actual area identified for the proposed plant is 33 acres. The salient features of the layout have been indicated in Table 4.1.

Table – 4.1

Salient Features of Plant Layout

Sl. No.	Items / Facilities	Values
1.	Area within plant boundary	33 acres
2.	Length of road	
a.	7.0 m wide	1.2 km
b.	4.0 m wide	7.7 km

5. MAIN PLANT FACILITIES

The proposed pellet plant #2 shall comprise the following major technological units. The facilities described below shall be able to produce iron ore pellets upto 9.0 MTPA.

- Day bin
- Wet grinding of iron ore fines
- Thickener & slurry tanks
- Filtration
- Coarse additives (limestone, dolomite, coke, bentonite) ground storage
- Coarse additives storage bins & grinding
- Storage cum mixing
- Balling
- Induration
- Pellet screening
- Product pellet storage bins
- Process gas dedusting system
- Emergency filter cake stock pile
- Belt conveyors, junction houses & inter-connecting galleries

Apart from the above major units which are elaborated in details below, other auxiliary facilities like material handling, water supply system, compressed air system, fuel gas distribution, air-conditioning & ventilation system, plant dedusting system, electrics, instrumentation & automation facilities etc. have also been envisaged. Adequate hoisting & handling facilities have been provided in all the units for ease of maintenance and operation.

5.1 Day bin unit

The iron ore fines shall be received on one reversible conveyor at top of day bins in this unit. This reversible conveyor will feed to two parallel reversible cum shuttle conveyors envisaged over two bays of day bins. Eight numbers of bins with effective volume 500 m^3 shall be envisaged for storage of iron ore fines.

The proportioned quantity of iron ore fines will be extracted from these bins through weigh feeders onto conveyors for further transportation to wet grinding unit. The flexibility of feeding any ball mills out of three from any iron ore fines bins shall also be envisaged in this unit. GCP dust shall also be received by dust tanker and pneumatically conveyed to dust bins. Total three numbers of GCP dust bins shall be envisaged in three junction houses before wet grinding unit. The required quantity of GCP dust shall be extracted through rotary airlock valve and fed to conveyors leading to wet grinding unit.

5.2 Wet grinding unit

The receiving conveyor from the day bin building shall feed the raw material to the screens provided before ball mills in wet grinding unit. The screen overflow shall be fed to three numbers ball mills and underflow shall be collected in a slurry tank. The slurry from slurry tank shall be pumped to classifying cyclones having #325 cut point. The overflow from classifying hydro-cyclones shall be collected in thickeners and the underflow shall be fed to the ball mills. Product from ball mills shall be collected into sump from where the slurry is pumped to hydro-cyclones.

Ball mills shall have hydro-cyclones in closed circuit for grinding raw material to 45 micron. The overflow of the hydro-cyclones shall be collected into thickener having approx. 80%, (-) 45 micron size passing. The underflow of the hydro-cyclones shall be reground in the ball mills.

5.3 Thickener & Slurry tanks

One number concentrate thickener of 55 m diameter shall be envisaged for thickening of Iron ore concentrate slurry received from hydro-cyclones overflow from wet grinding unit. The thickened slurry shall be pumped to slurry storage agitator tanks which shall be pumped to the Filtration unit for getting filter cake for further transportation to mixing unit. The thickener overflow shall be fed to Pump house.

This thickener is provided with flocculent system.

5.4 Filtration

The slurry from the slurry agitator tanks (2 nos.) shall be pumped to the filters for filtration and the filter cake shall be discharged to the cake conveyors. The filter cake from the cake conveyors below each filter shall be collected on a common reversible conveyor which shall either convey the material to the mixing unit or to emergency storage area. The water required for cloth wash and manifold flush water shall be pumped from pump house. The filtrate water shall be collected in filtrate tanks and shall be pumped to thickener to reduce the mineral content in the filtrate water.

Each filter will be equipped with cloth shaking and cloth flushing system for improved cake discharge and reliability. Cloth flushing will be applied after each cycle when the plate pack is open and cake discharge is complete. Flushing water will be collected with swivel plates underneath the plate pack.

The filter cake having moisture content in the tune of 9.5 % collected from filters shall then be transported to storage cum mixing unit.

5.5 Coarse additive ground storage unit

Coarse additives like limestone, dolomite, coke & bentonite shall be received at one common ground storage unit inside pellet plant #2 by truck. The individual raw additive shall be fed by pay loaders onto one outgoing conveyor through over-ground hoppers & vibro-feeders as per requirement and transported to respective bins in coarse additive storage bins unit.

5.6 Coarse additives storage bins & grinding

Coarse additives shall be stored in separate bins, two numbers each for limestone, dolomite, coke & bentonite. The effective volume of each bin shall be approx. 200 m^3. Limestone & coke and dolomite & coke shall be fed from the storage bins, to two ball mills on time sharing basis and

bentonite to one vertical roller mill for grinding, by means of belt weigh feeder & feed hopper. Ball mills shall be complete with mill feed hopper, air slide, damper, cyclone, bag filter, hot gas generator, circulation fan, surge hopper and transport vessel. Roller mill shall be complete with rotary airlock valve, classifier, bag filter, hot gas generator, circulation fan, surge hopper and transport vessel. Ground additives from this unit shall be carried to respective ground material storage bins in storage cum mixing unit by pneumatic conveying.

5.7 Storage cum mixing unit

Ground ore concentrate (filter cake) shall be received from filtration unit by belt conveyor and fed to four numbers of bins, two of effective volume 780 m^3 and other two of 730 m^3 through one reversible and slewable belt conveyor on top of the bins. Ground bentonite and mix (flux-tone & coke) from additive grinding unit shall be fed pneumatically to respective bins in this unit. Four number of bins, each of effective volume 400 m^3 for mix, two numbers each of effective volume 450 m^3 for bentonite and one bin of effective volume 200 m^3 for ESP dust shall be envisaged. ESP dust shall be pneumatically transported to ESP dust bin from process & plant dedusting ESPs. ESP dust bin shall have twin outlet with rotary weigh feeders.

Belt weigh feeders shall be mounted at outlet of filter cake bins and rotary weigh feeders at outlet of ground additive & ESP dust bins. All additive bins are equipped with bag filters for cleaning the transport air. Materials discharged from these bins shall be transported to two (02) High intensity mixers by belt conveyors for thorough mixing. Belt weigh scale shall be installed on conveyors before the mixer to control the feed rate of raw mix to the mixer.

The HI mixer shall be provided for thorough mixing of raw materials with controlled addition of process water to form green pellets with sufficient mechanical strength to withstand the subsequent transportation, screening and heat treatment process, and to adjust the chemistry of the pellets to favour the production of mechanically resistant product pellets with a high

compression strength and low abrasion indices, and to adjust the chemistry of the product pellets. The moisture content of the raw mix is raised to approximately 9.5%. The mixed material from the mixer shall be transported by series of belt conveyors to balling unit.

5.8 Balling unit

The production of green pellets is performed in thirteen (twelve operating and one stand-by) closed pelletizing discs circuits. The mixed material received from storage cum mixing unit shall be distributed to mixed material bins, each with storage capacity of 40 m^3, installed directly above each balling disc. All the bins shall be load cell mounted. A horizontal conveyor equipped with pneumatically operated ploughs will distribute the mixed materials into the mixed material bins. Any spillage passing under these ploughs will be discharged at the head end of the conveyor and re-circulated through mixed material route or stored in emergency stockpile.

The material discharge from each mixed material bin will be controlled by dosing belt weigher equipped with variable speed drive, thus feeding the required amount of mixed material onto the corresponding pelletizing disc. The dosing belt weigher will discharge mixed material into the disc feeding chute, which are equipped with fluffing device for disintegration of any compacted material as well as for a distribution of the mixed material on the pelletizing disc. The green pellets will be formed in the discs with a diameter of 7.5 m each, with simultaneous and variable addition of water. The inclination of each disc will be variable and optimum setting (approx. 44 to 53 deg.) is to be determined during start-up, according to mixed material properties, desired green pellet diameter and feed-rate. The rotary speed of the disc can also be varied during operation by means of frequency-controlled motor, depending on the pelletizing characteristic of the concentrate mixture. It can be possible to regulate the disc rpm from 5 to 7.5 during operation. The green pellets from the pelletizing discs will be conveyed to a single deck roller screens where undersize (<9 mm) and oversize (>18 mm) green pellets will be crushed in disintegrators installed on belt conveyors for reject pellets. In case of emergency and during start-up of a disc, when the green pellets will not have the required properties, the disc discharge can thus be recycled or discharged to an emergency

stockpile by conveyors. The green pellet of (9-18) mm from the single deck roller screens will be finally discharged to the green pellet collecting belt conveyor, which is equipped with a reciprocating head. This belt conveyor ensures the smooth handling of the green pellets.

A belt weigher will be installed at the collecting belt conveyor for weighing the total amount of green pellets discharged from the pelletizing discs. This belt weigher is used for mass balancing and serves as a standby signal for the speed control of the induration machine. The head pulley of this conveyor is supported in a reciprocating carriage, which moves the head pulley over the width of the downstream perpendicularly arranged wide belt conveyor. The forward velocity of the carriage with the head pulley is identical to the belt speed and during the backward stroke the green pellets are discharged onto the wide belt conveyor. The wide belt conveyor will discharge the green pellets onto the double deck roller screen. The bi-layer double deck roller screen will split the green pellets into two layers on the indurating machine. The screen sorts pellets with smaller diameter at the bottom of the bed and the larger pellets at the top. Undersize & oversize green pellets from the bi-layer double deck roller screen will be recycled by belt conveyors back to the green pelletizing area after crushing in disintegrator. The rollers on screen deck shall be chain driven by variable speed drive/ individually driven rollers. A belt weigher will measure the amount of undersize & oversize green pellets.

5.9 Induration

The traveling grate machine on which the green pellets will be heat treated, indurated and cooled will have a minimum reaction area of 816 m² (4 m wide and 204 m long). This travelling grate will consist of an endless chain of pallets, which continuously revolve. One of the process pre-requisites for obtaining a uniform product quality is a uniform bed height. This will be ensured by automatic control of the traveling grate speed as a function of the ultrasonic level measuring devices installed after green pellets are charged to travelling grate. Grate speed control by ultrasonic has significantly reduced the response times and thus improved pellet bed leveling on the indurating machine. Thermal attack on the pallets

and grate bars, which would lead to excessive wear, will be avoided by using a hearth and side layer of indurated pellets. Side layer is used for protecting the sidewalls of the pallets. A storage bin for hearth and side layer will be arranged at the feed-end of the travelling grate. A motor-driven discharge gate can adjust the height of the hearth layer on the pallets. The standard height for this application is approx. 80 mm. The three components are fed onto the pallets in the following order:

- Hearth layer
- Side layer
- Green pellets

The hearth and side layer bin is equipped with an emergency chute which permits additional filling of the pallets with hearth layer in case of failure in the green pellet feeding system and thus protecting the pallets and grate bars from over-heating. The required green balls, in the size range of 9 to 16 mm shall be fed to the indurating machine for heat hardening.

Green pellets are then subjected to the following different thermal zones during the process of induration on travelling grate machine:

Thermal Zones	Process Gas Temperature (deg.C)
Up-draught drying Zone (UDDZ)	330
Down-draught drying Zone (DDDZ)	380
Preheating Zone	400 - 1270
Firing (Induration) & After firing Zone	1270 - 1190
First cooling zone	30
Second cooling zone	30

After drying of green pellets in the up-draught and down-draught drying zones, the dried pellets will be preheated to a progressively higher temperature to initiate oxidation and sulphur burning with fuel (coke) present in the green pellets.

The dried pellets will then be fired at approx. 1300°C to provide the re-crystallization and slag bonding which will impart adequate strength to the pellets. An unfired short section designated as 'after firing' allows the heat front to completely penetrate into the bottom of the bed thereby eliminating sudden quenching of pellets and consequent deterioration of pellet properties.

Cooling of indurated pellets shall be accomplished by up-draughting ambient air, supplied by cooling air fans, through the pellet bed. The cooled pellets will leave the indurating machine at 100°C or less.

Process gas flow

The induration process is characterized by maximum recovery of heat from the cooling zones as well as firing zone of the travelling grate machine. This calls for recirculation of hot gases through ducts to different process zones using five fans.

A total of five process fans have been envisaged and are as follows:

- Cooling air fans
- Up-draught drying fan
- Wind box recuperation fan
- Hood exhaust fan
- Wind box exhaust fans

For the purpose of recovery of heat, the travelling grate will be provided with a refractory-lined hood above the machine all along the length. Seal boxes are used in different zones to seal this indurating hood against the moving pallets to avert heat loss. The hood will be provided with water-cooled side and transverse lintels.

The following is a brief description of the process gas flow:

Hot combustion gases from the cooling zone 1 will enter the firing zone by the direct recuperation principle. Burners will be arranged opposite to each

other on the longitudinal sides of the preheating and firing zone. The arrangement and sizing of the burners will ensure a uniform hot gas temperature over the width of the pellet bed. Since the burners are divided in several control zones, an optimum temperature profile can be adjusted thus permitting an optimum heat treatment of the green pellets. The burners will operate with mixed gas (blast furnace gas & coke oven gas) or coke oven gas. The temperatures in the individual control zones of the preheating and firing zone are measured with thermocouples and indicated by the central control system. They will serve as control variables for the automatic supply of fuel to the burners. Intake and circulation of the air & gas required for the process will be ensured by the application of process fans.

The induration process is characterized by the recovery of maximum heat from cooling of the hot pellets meaning transportation of recovered hot air from the first cooling zone to the preheating and firing zone without a fan. The cooling air fans will suck in ambient air through a silencer and force this air through an air duct into the wind-boxes of cooling zone no. 1 and no. 2. The cooling air which becomes heated after passing through the hot pellet bed is collected in the first and second cooling hood. These hoods are installed directly above and sealed against the travelling grate. Hot air collected in the second cooling hood will be extracted by the up-draught drying fan and forced through duct into the wind-boxes of the up-draught drying zone. Wind-box pressure in the up-draught drying zone is automatically controlled by a damper which leads excessive air to the hood exhaust gas system. Hot process gas from the wind-box recuperation system (supplied via a bypass) will be extracted and forced through a duct & a damper into the hood above the preheating zone. The hot gases of the downdraft drying, preheating and firing zone are sucked in "downdraft" through the pellet charge by fans. The wind-boxes of the downdraft drying zone, the preheating zone and a part of firing zone are connected to the wind-box exhaust fans. Before being exhausted, the process gases are cleaned by electrostatic precipitators. The wind-box exhaust fans discharge the waste gases to atmosphere through waste gas stack. Recovered dust discharged from the ESPs will be transported to the dust collecting bin (ESP dust bin in mixing unit) through pneumatic conveying system. The

collected dust is added in a controlled way to the process. All clean gases from the process ESPs system will be released via one common stack to the atmosphere. The hot combustion gases from the last section of the firing and the after-firing zone will serve as drying gases in the downdraft drying zone. They will be sucked through the pellet bed by the wind-box recuperation fan and then forced via gas ducts into the hood above the downdraft drying zone. An appropriate temperature profile in the preheating zone is essential for the production of high quality oxide pellets. This temperature profile can be adjusted easily by mixing controlled quantities of second cooling air / wind-box recuperation air, supplied by a fan. In order to maintain a constant and optimum temperature of the drying gases and to protect the wind-box recuperation fan from overheating, a bleed-in for ambient air, equipped with control dampers, is provided at the suction side of the wind-box recuperation fan. One by-pass between the wind-box recuperation and the updraft drying system will allow the passing of heat from the one to the other system. The humid exhaust air from the up-draught drying hood is sucked off by the hood exhaust fan. Hot excess gas from the recuperation fan is added in order to raise the temperature of this air and to control the pressure in the downdraft hood. The exhaust gas will be cleaned in an electrostatic precipitator and directed to atmosphere together with the waste gases via the common waste gas stack. A grate bar cleaning device will be located near the lowering station on the return track of the travelling grate.

The cooling zone of the indurating machine is designed to cool down fired pellets in normal operation to temperature of approx. 100 °C or below. The product belt conveyors will be equipped with emergency water spray systems, which help to protect the belt conveyors in case hot pellets are discharged from the indurating machine. The cooled pellets will be discharged from the indurating machine into the discharge bin, mounted on load cells and then transported to pellet screening unit.

5.10 Pellet screening

In this unit, vibrating screen is installed to separate out certain quantity of fired pellets from the product pellets, which will be recycled as hearth layer

to the indurating machine. The product screen will mainly consist of vibrating screen decks to segregate the following size fractions of fired pellets:

- hearth layer pellets : 12.5 – 16 mm
- product pellets : balance 12.5 -16 mm, <12.5 mm and >16 mm

Sized pellets are used as hearth layer to avoid clogging of side layer chutes and improve the permeability of the hearth layer and thus reduce pressure drop and energy consumption of the system. Screened hearth and side layer will be transported by belt conveyors to the hearth layer bin at the feed end of the indurating machine. Vibrating feeders determine the portion of on-spec product pellets to be used as hearth layer and is controlled by the level of the hearth and side layer bin. A belt weigher will register the production rate of the pellet plant. A sampler shall be installed in the discharge chute of product conveyor, which will take samples for pellet quality control.

Suitable arrangement shall be made in pellet screening unit to by-pass the screen, if required.

5.11 Pellet storage bins

Product pellet from pellet screening unit shall be transported to pellet storage bins by belt conveyor. The storage capacity of the unit shall be approx. 11 hours of finished pellet production.

However, one emergency finished pellet ground stock pile near pellet screening unit shall also be envisaged.

5.12 Emergency filter cake stock pile

One covered shed for emergency filter cake storage shall be provided near filtration area. The filter cake shall be discharged to the stock pile by tripper conveyor. The provision for reclamation of the filter cake from stock pile

and feeding to the conveyor leading to storage cum mixing unit shall also be provided.

5.13 Belt conveyors, junction houses & inter-connecting galleries

Various belt conveyors, interconnecting structural galleries and junction houses shall be envisaged as per the technological layout of pellet plant.

The typical layout and process flow sheet of the proposed pellet plant are shown in drawing nos. MEC/11/02/Q7GK/FR/PP/01 and MEC/11/02/Q7GK/FR/PP/02.

6.1 WATER FACILITY

01 General

Water for the proposed wet grinding & filtration units and pellet plant proper will mostly be required for direct and indirect cooling of plants/ machines/ equipment with a minor part to be consumed for drinking & sanitation purpose and other direct process & general purpose needs. Individual recirculation system has been envisaged for water system of various plant units to effect extensive recycling and reuse of return water from plant processes after necessary treatment and conditioning.

02 Requirement of Water

The total make-up water requirement for the proposed pellet plant is estimated as 205 m^3/h (approx).

03 Make up water requirement

The estimated maximum make-up water requirement for the proposed plant facilities is indicated below:

Sl. No.	Description	Make up water Requirement, m^3/h
1.	Grinding & Filtration Unit	125
2.	Pellet plant	25
3.	Compressed air station	25
4.	Service water	15
5.	ACVS	10
6.	Drinking water (pellet plant complex)	2
7.	Fire water	1
8.	Misc. Consumers	2
	Total	**205**

04 Water System Facilities

To cater to the water requirement of the proposed plant, the following water system facilities have been envisaged:

a) Process cooling water system
b) Make-up water system
c) Drinking water system
d) Water based fire-fighting system
e) Emergency water system including overhead tank
f) Interplant pipelines
g) Water pollution control & conservation.

Process cooling water system

A. For open direct cooling water cycle
B. For open industrial water cycle

The above water recirculation systems will mainly comprise the following main units:

For open direct cooling water cycle

- Pumping system
- Thickeners & Filter Press
- Make-up Water supply
- Interconnecting piping
- Chemical dosing system
- Electrics, instrumentation & control system

For open industrial water cycle

- Cooling Tower
- Pumping system
- Partial stream filters
- Interconnecting piping
- Chemical dosing system
- Electrics, instrumentation & control system

Make-up water system

Industrial quality make-up water shall be tapped from TOP with an isolation valve. It shall be used as make-up to industrial re-circulating water circuit for grinding & filtration unit, pellet plant, compressor cooling, make-up to fire water reservoir, service water needs etc. Make up water will be distributed to various consumers through a makeup water

network.

Drinking Water System

For meeting the drinking water needs of the plant, drinking water shall be tapped from TOP with an isolation valve. Drinking water will be distributed to various consumers through a drinking water network.

Fire Fighting water system

A fire fighting water hydrant network shall be provided for the proposed plant encompassing the various fire hazards units/ areas of the entire plant territory. The water hydrant network shall comprise adequate number of indoor and outdoor hydrant along-with hoses and nozzles. A tapping from industrial water network shall be connected to respective storage tank of fire fighting pump house for initial filling & top-up.

Emergency Water Overhead tanks

Emergency overhead tanks will be provided at a staging height of 40-50 m for 30 minutes supply of emergency water to critical consumers of pellet plant units for a short duration in the event of interruption in normal cooling water supply. The overhead tanks will be multi-compartment type, compartment serving emergency water, service water requirements of individual consumers. The filling of emergency water tanks for loss of water under normal operation and supply of cooling water from the tanks under emergency conditions will be under automatic control.

Overhead tanks will be provided with overflow, drain and air vent connections. Overflow from various tanks will be collected for reuse in the plant water system.

Interplant pipelines

Industrial water for make-up water supply and general plant usage will be met through the proposed make up water pipeline to be laid from the make-up water pump house.

Fire fighting water networks have been envisaged with adequate number of yard hydrants as well as indoor hydrants covering the entire plant area.

Drinking water will be met through proposed drinking water pipe networks. Service water, fire-water and drinking water pipelines will generally be laid buried underground. Process cooling water supply and return lines will generally be laid overhead on steel structural trestles & bridges and in underground tunnels.

Water pollution and conservation

Extensive recycling has been adopted in the design of plant water system. Quality of circulating water will be maintained through dosing of conditioning chemicals for controlling corrosion, scale deposit and microbial growth. Waste water from makeup water treatment plant will be neutralized before discharge from the plant. The sludge arising out of different circuits will be disposed of at suitable location

6.2 FUEL GAS FACILITY

Mixed gas (BF+CO) or coke oven gas shall be used as fuel for the proposed Pellet Plant. The calorific value (CV) of mixed gas (BF+CO) and coke oven gas shall be approximately 1860 kcal/Nm^3 and 4000 kcal/Nm^3 respectively.

It is proposed that separate pipe lines from take over point (TOP) near pellet screening unit of proposed pellet plant shall be laid along with supporting structures for supply of mixed gas and coke oven gas to new pellet plant. Further, steam and nitrogen pipe lines shall also be laid along with mixed gas & coke oven gas lines for purging application of the fuel gas lines, as and when required. Fuel gas pipe lines shall be laid in slope. Hence, necessary vents, purge connection and condensate seal pots shall be provided in the mixed gas line and coke oven gas line for which required hoses, piping, valves & fittings are to be provided for the completeness of the piping system.

In addition to above, compressed air / instrument air pipe lines shall also be laid upto consuming points from compressed air stations.

The interplant piping network shall consist of a common trestle/ stocked/ bridge carrying above mentioned fluid pipes up to consumers points. However, in-shop piping network shall consist of pipes carrying above fluids supported with building columns/ structures. Approach ladders, hand railings etc. shall be provided for valve operation on overhead interplant & in-shop piping network.

Bigger fuel gas pipelines shall be fabricated from carbon steel plates. However, small diameter fuel gas pipes shall be of IS:1239 ERW.

For steam services, all pipes, valves & fittings (i.e. bend, TEE, reducers etc.) shall be of IBR quality. Mineral wool and aluminium cladding shall be used for insulation of the steam line. Steam traps shall be used for removal of condensate from steam line. For steam services, all pipes shall be of ASTM A106 Gr. B and valves (gate or globe valve) shall be of “forged steel”.

For nitrogen service, ASTM A106 Gr. B pipes shall be installed with forged steel Class-800 for DN50 & below gate valves and for above DN50, class 150 cast steel gate valve shall be used for isolation.

For compressed air/ instrument air, pipes shall be ERW and CI lubricated taper plug valves, CI ball valves along with moisture traps and Y-strainers shall be used. For instrument air, pipes shall be galvanized.

6.3 COMPRESSED AIR FACILITY

For Filter Press

01.01 Air compressors

Oil lubricated, screw type air compressors complete with all accessories and mountings along with all necessary electrics & control and instrumentation are envisaged to cater the need of compressed air for different units/ sub-units of filter press. Compressors will have matching accessories/ facilities etc. as required.

No. of Compressors	6 nos.
Air volume flow (each compressor)	64 m^3/min FAD
Discharge Pressure at outlet flange of after cooler and moisture separator	12.5 kgf/cm^2g
Service duty	Continuous
Installation	Indoor
Environment	Dusty

Each compressor shall be designed to meet the flow parameter as mentioned above at the rated discharge pressure. These compressors shall be located on ground beneath filter cake conveyors platform in filtration unit.

01.02 Air Receivers

There will be three (3) nos. of air receivers of 150 m^3 capacity and working pressure of 12.5 kgf/cm^2g. Air receivers shall be of carbon steel material (SA516, Gr70) and welded construction complete with all accessories.

For Pellet Plant proper

02.01 **Air compressors**

Integrally geared centrifugal air compressors complete with all accessories and mountings along with all necessary electrics & control and instrumentation are envisaged to cater the need of compressed air for different units/ sub-units of filter press. Compressors will have matching accessories/ facilities etc. as required.

No. of Compressors	4 Nos.
Air volume flow (each compressor)	115 Nm^3/min
Discharge Pressure at outlet flange of after cooler and moisture separator	8 kgf/cm^2g
Service duty	Continuous
Installation	Indoor
Environment	Dusty

Each compressor shall be designed to meet the flow parameter as mentioned above at the rated discharge pressure. One compressed air station shall be envisaged to cater the requirement of pellet plant proper and instrument air.

For Instrument air

03.01 **Air compressors**

Oil lubricated, screw type air compressors complete with all accessories and mountings along with all necessary electrics & control and instrumentation are envisaged to cater the need of compressed air for different units/ sub-units of filter press. Compressors will have matching accessories/ facilities etc. as required.

No. of Compressors	2 Nos.
Air volume flow (each compressor)	25 Nm^3/min
Discharge Pressure at outlet flange of after cooler and moisture separator	8 kgf/cm^2g
Service duty	Continuous
Installation	Indoor
Environment	Dusty

Each compressor shall be designed to meet the flow parameter as mentioned above at the rated discharge pressure.

03.02 **Air drying plant**

The air drying plants are envisaged to install adjacent to the compressors in the compressed air station building to meet the requirement of instrument air. The dryer shall be completed with all accessories and mountings.

The dryer shall be supplied along with all necessary auxiliaries. Design considerations of the drying units are indicated below:

No. of Air Dryer Unit	2 Nos. (2W)
Air volume flow (each)	25 Nm^3/min
Inlet air pressure	8.0 kgf/cm^2 (g)
Service duty	Continuous
Inlet air temperature	Same as compressor outlet

6.4 AIR CONDITIONING AND VENTILATION SYSTEM

Air conditioning & ventilation systems shall be provided for proper working conditions necessary for maintaining environment compatible with human hygienic requirement and to maintain conditions necessary for proper storage of materials and working of plant & equipment. The air conditioning & ventilation systems shall generally include equipment and accessories such as fan, air washer unit, air filter, air conditioning unit, duct work, pump set, cooling tower, air supply grills, dampers, insulation, electrics, instrumentation and controls etc.

Air conditioning & ventilation systems shall be designed considering the climatic conditions prevailing in the region and the system shall generally be installed in separate plant room independent of the served premises. The plant room shall be provided integral with or adjacent to the served premises at proper locations on considerations of convenience of routing of ducts/ pipes, availability of fresh uncontaminated air and creating least disturbance to the adjacent premises in terms of vibration and noise.

Air conditioning & ventilation systems shall be provided with adequate measures for safety and fire fighting for fire hazardous areas and shall be of flame proof / explosion proof construction.

6.4.1 Ventilation facilities

Buildings and shops shall generally be provided with natural ventilation. Mechanical ventilation shall be provided for premises where adequate ventilation can not be provided by natural means alone.

Depending upon the specific requirement, the shops / buildings shall be provided with either exhaust ventilation or plenum ventilation. The system design shall take into account the requirement of air changes as well as excess heat removal. Filters shall be provided with plenum system. By plenum ventilation, the served premises shall be pressurized to 2-3 mmWC to avoid ingress of dusty air. Hot work areas shall be provided with portable man-coolers for spot cooling. Man-coolers shall also be provided in a few other areas where the premises are manned and have high heat radiation. The details and types of systems proposed are indicated in the table given below:

Location/ Shop	Facilities
Electrical premises, Switch gear room, Cable basements of Electrical sub-stations	Plenum ventilation with washed air.
Battery room, pump house, compressor room, toilets, stores etc.	Exhaust ventilation
MCC room of compressed air station	Plenum ventilation with fan and filter

6.4.2 Air conditioning facilities

Premises requiring stringent environmental conditions of temperature and humidity shall be air-conditioned. Room air conditioners, package air conditioners shall be provided for air conditioning of these premises; the selection depends on the specific requirement of the application in terms of cooling capacity, temperature, humidity and freedom from dust. The instrument control rooms shall be generally maintained at a temperature of 23 ± 2^0C and relative humidity 55±5%. Dust concentration shall not exceed 0.1 mg/m^3. Office rooms/ In-charge's rooms shall be provided with room air conditioners for personal comfort.

The types of air conditioning system proposed are as indicated below:

Location/ Shop	Facilities
Main Control room	Centralized/ Package type air conditioning system with standby provision as per cooling load calculation
Office rooms/ In-charge rooms	Split type room air conditioners

6.5 PROCESS AND PLANT DEDUSTING

6.5.1 General

The pollutants in the form of solids, liquids and gases are generated from the various technological units, and if let out as such, will have hazardous effect on the environment. Pollution of the environment not only adversely affects the flora and fauna but also shortens the life of plant and equipment. This vital aspect, therefore, has been taken into account while planning the plant and equipment and adequate measures have been proposed to limit the emission of pollutants within the stipulations of statutory norms.

Air Pollution

Air, in and over the plant area and beyond its boundaries, gets polluted with gases, fumes and dust particles emanating from the processes, chimneys, transfer points of conveying and handling equipment. The air pollutants in Pellet plant are mainly dust and gases like sulphur dioxide, carbon monoxide, nitrogen oxides etc.

Water Pollution

Water pollution mainly comprises inorganic solids, oil, grease etc. in suspension, solution and emulsion.

Noise Pollution

Many operations in the Pellet plant will produce objectionable level of noise, which may not be eliminated entirely, but in most areas it can be brought down to acceptable level. The major noise generating equipment are process fans, compressors, ball mills etc.

6.5.2 Pollution Control Measures

Air pollution control

The measures to control the air pollution will ensure that the emissions conform to the norms stipulated by the State Pollution Control Board and

the Central Pollution Control Board. Moreover, it will be ensured that the ambient air quality in nearby areas conform to the National Ambient Air Quality Standards stipulated by the Central Pollution Control Board. The work zone air quality will conform to the norms stipulated by the Factory Act.

The system proposed for air pollution will provide acceptable environment conditions in the working areas and abate air pollution in the surrounding areas of the pellet plant complex. The technological equipment and processes have been selected with the above objective. The efficiency of ESPs/ bag filters shall be such that the emission of dust from stack will not be not more than 10 mg/Nm^3. Depending upon the quality of emissions from different sources, suitable air pollution control systems will be provided. The chimney heights will be as per CPCB norms to ensure Ground Level Concentration (GLC) of different pollutants within permissible limits.

Various dust/ fume extraction system envisaged are indicated in the table given below:

Sl. No.	Location / Shop	Air Pollution control facilities
1	Indurating machine charging & discharging areas, HL bin discharge, screening etc.	Fume extraction system comprising ESP, centrifugal fan and motor, ductwork including suction hoods, duct supports, stack etc.
2	Limestone, dolomite, coke and Bentonite storage bins in additive storage and grinding unit	Dust extraction system comprising pulse jet type bag filter, centrifugal fan and motor, duct work including suction hoods, duct supports, stack etc.
3	Ground mix (limestone + coke, dolomite + coke) and bentonite bins	Dust extraction system comprising pulse jet type bag filter, centrifugal fan and motor, duct work including suction hood, duct supports, stack etc.

Sl. No.	Location / Shop	Air Pollution control facilities
4	Hood Exhaust and Wind box exhaust gases	Fume extraction system comprising ESP, centrifugal fan and motor, ductwork including suction hoods, duct supports, stack etc.
5	Junction houses	Dust extraction system comprising pulse jet bag filter, centrifugal fan and motor, duct work including suction hood, duct supports, stack etc.

Details of stacks envisaged for different pollution control systems are indicated in below table:

Sl. No.	Description	Parameters	Remarks
1.	Common Stack for hood exhaust and wind box exhaust ESPs	Stack height = approx. 80 m	
		Flue gas velocity = As per IS 6533 part-1 (normally in range 15 -18 m/s)	
		Flue gas flow (approx.) = 2147520 Nm^3/hr, rated and 2506140 Nm^3/hr, design	
		Top diameter = approx. 9.7 m	
		Exit temperature = 140 - 165 deg.C	
2.	Stack for Plant dedusting system	Stack height = approx. 50 m	
		Flue gas velocity = As per IS 6533 part-1 (normally in range 15-18 m/s)	
		Flue gas flow (approx.) = 198000 Nm^3/hr, rated and 210000 Nm^3/hr, design	
		Top diameter = approx. 2.6 m	
		Exit temperature = 50 - 95 deg.C	

3.	Stack for bag filter of Pellet bins storage unit	Stack height = approx. 45 m	
		Flue gas velocity = As per IS 6533 part-1 (normally in range 15 - 18 m/s)	
		Flue gas flow (approx.) = 170000 Nm^3/hr	
		Top diameter = approx. 2.2 m	
		Exit temperature = 60 deg.C	

However, in order to meet the statutory ground level concentration limits for SO_2, NOx and other gaseous pollutants, suitable stacks height will be provided for proper dispersion as per CPCB norms. Stacks will be provided with porthole and working platform so that stack monitoring can be done as per norms of statutory authority.

Water Pollution Control

All effort will be made to ensure minimum discharge of polluted water. Whatever water is discharged, it shall conform to the norms specified in schedule-V of Environmental Protection Act, 1986.

The pollutants present in waste water will be reduced to acceptable levels by adoption of the following schemes:

- Re-circulating water in the process whereby discharged volume is minimum,
- Clarifier and sludge pond for removal of suspended solids,
- Neutralisation of acidic water by lime,
- Removal of oil and grease from contaminated water by means of oil traps, skimming devices etc.

Noise Pollution Control

Various measures proposed to reduce noise pollution will include reduction of noise at source, provision of acoustic lagging for the equipment & suction side silencers, vibration isolators, selection of low noise equipment and isolation of noisy equipment from working personnel. In some areas where it is not feasible to bring down the noise

level within acceptable limits due to technological process, personnel working in these areas will be provided with noise reduction aid such as ear muffs/ ear plugs and also the duration of exposure of the personnel will be limited as per the norms.

Waste material management

The various waste materials arising out of the technological processes will be re-utilised to the extent possible.

Green Belt

Adequate green belt will be provided inside and all around the plant premises. Green belt will be developed along the roads and around various shops & offices.

6.6 CIVIL WORKS

6.6.1 General

Civil work comprises all plant units, its auxiliaries, roads, drainage, sewerage and all other infrastructure within the plant boundary. In general, specification/ details in respect of type of structures, grade of concrete, materials etc. for all major units have been assumed to be similar to standard practice of civil works.

6.6.2 Geo-technical data

As the soil in the proposed plant is having very low bearing capacity, the entire plant has been considered to be supported on Pile foundations. The exact load bearing capacity of Piles shall be as per geo-technical data.

6.6.3 Type of Civil Work

- Underground transfer point/ junction houses shall consist of RCC basement structure supported on Piles.
- Pile foundations for steel structure trestles carrying over ground conveyor galleries shall be provided.
- Pile foundations shall be provided for all Super Structure units with Structural Steel, along with RCC floor slabs/ steel chequered plate floors supported on Structural Steel Beams. The ground floor/ grade floors shall be provided as RCC base slab on PCC sub-base over boulder/ stone soling.
- RCC framed structures shall have Pile foundations, RCC column, beams, floor slab and roof slab. Floors with suitable floor finish and roof with suitable water proofing treatment shall be provided.
- The surface drainage system of the plant has been considered to have open drains of RCC construction. RCC culverts/ pipe culverts shall be provided at road crossings for drains.
- All underground RCC basement structures (base raft, walls etc.) shall be designed as cracked section. However, water retaining structure like underground/ partly underground/ on ground water reservoirs/ sumps etc. shall be designed as per latest IS: 3370.

6.6.4 Concrete Grade

Design Mix Concrete of minimum following grades shall be used:

For RCC works:

M-30	Water/ Liquid Retaining RCC Structures
M-25	RCC works for all foundations/ substructures, superstructure elements of all buildings, equipment foundations etc
M-20	For drains, minor structure like pits etc.

For PCC works:

M-7.5	Lean concrete below foundations, etc.
M-10	For PCC works
M-15	Screed concrete, grade floor, apron & pavement

6.6.5 Building Material

Cement

In general, 53 grade Sulphate resisting Portland Cement confirming to IS: 12330 shall be used.

Reinforcement Steel for RCC

For all RCC work, Fe-500 Grade TMT Bars (reinforcement) conforming to IS: 1786 shall be used.

6.6.6 Standards & Codes of Practice

In general, following latest IS codes shall have to be referred:

IS : 456-2000	Code of practice for plain and reinforced cement concrete.
IS : 875-1987	Code of practice for design loads for buildings

	and structures.
IS : 2974	Code of practice for design and construction of machine foundations.
IS : 3370	Code of practice for concrete structures for the storage of liquid.
IS: 1893-2002	Criteria for earthquake resistant design of structures. General provisions and buildings.

Apart from the above, wherever necessary, other relevant Indian Standard Code of practices/ IRC standards shall be considered as per BIS.

6.7 BUILDING STRUCTURES

6.7.1 Steel structural work shall cover all building structures viz. columns, beams, storage bins, roof structures, wall structures, platforms, crane girders, monorails, bracings, ladders, staircases, handrails etc. The work shall also include sheeting work for roofing and side cladding in various junction houses, buildings and conveyor galleries. Total structural work shall be complete in all respect for proper functioning of all plant and equipment.

Units / buildings

- Covered ground storage unit for coarse additives (limestone, dolomite, coke & bentonite)
- Coarse additive storage bins & grinding
- Day Bin
- Wet grinding
- Slurry storage tanks
- Filtration
- Emergency filter cake storage shed
- Storage cum mixing
- Balling
- Induration
- Pellet screening
- Pellet bin storage
- Electrical sub-stations
- Pump house
- Compressed air station
- Chiller plant
- Process Gas Stack
- Plant de-dusting stack
- Junction Houses
- Conveyor Galleries
- Pipe supporting structures
- Cable Galleries

Steel Structures

- Columns (rolled section or built-up), Column bracings.

- Stairs, ladders and crossovers with safety hoops.
- Handrails, Roof Handrails.
- Walkways with chequered plate / gratings / pre-cast slabs.
- Working platforms, maintenance platforms, Gable Platforms.
- Silos/ Hoppers, Roof Trusses, Roof Girder.
- Crane Girders, Monorail Beams & Supports.
- Purlins, Floor Beams, Sheeting Posts, Side runners, Louvers, Bracings, Sag angles, Sag rods, wind-ties on roof.
- Expansion provision.
- Steel gates, doors, shutters, metallic partitions.
- Wind girders, Gutters and Down-comers.
- Gallery truss, Gallery Trestles, Bracings, Rafter & rafter bracings for gallery truss, End portal, Top & Bottom chord Bracings for Gallery Trusses, Roof & side cladding with Colour coated metallic and Translucent sheeting etc.
- Rail & Rail Fixtures.
- Cable Bridges & Pipe Racks.

6.7.2 Design Considerations

General

Design of steel structures shall be done in accordance with IS:800 - 2007 or any equivalent international code of practice. The following loads shall be considered while designing the structures:

- All live loads shall be in accordance with IS: 875 in addition to the technological loads indicated by the equipment manufacturer/ supplier
- Wind loads shall be in accordance with IS: 875 (Part-3)-2015
- Seismic loads shall be in accordance with IS: 1893-2015 part IV
- For design of bins and loading hopper, IS: 9178 (Part I to III)-1979 shall be followed
- Temperature load
- Dynamic load factor due to impact from vibratory / reciprocating machinery, motor etc.

Resonance in Structures

Structures supporting vibratory/ reciprocating equipment shall be designed so as to obviate occurrence of resonance. The ratio of applied frequency to natural frequency shall not lie within the range of 0.7 to 1.4.

6.7.3 Material of Construction

The material for the structures to be designed shall be as follows:

i) All rolled sections and plates up to 20 mm thick shall conform to Grade- E250 & quality A of IS:2062-2011 and shall generally be of tested quality (semi-killed).
ii) Plates beyond 20 mm thick and up to 40 mm thick subjected to dynamic loading shall conform to Grade- E 250 & quality BR as per IS:2062-2011 (rolled in killed condition).
iii) Plates beyond 40mm shall conform to Grade- E 250 & quality BR as per IS:2062-2011 in normalized and ultrasonically tested quality.
iv) High strength micro-alloyed steel shall conform to SAILMA 350 HYA/ HYB (SAIL product).

Steel sheets shall conform to IS: 1079-2009.

Chequered plates shall conform to IS: 3502-2009.

All gratings shall be of MS pressure locked electro-forged.

The electro-forged gratings shall be of approved brand and of approved manufacturer unless otherwise agreed by purchaser. The type of grating selected shall be based on the loading, for the area in which the grating is provided and shall be subject to approval of purchaser.

Steel tubes for structural purposes shall conform to IS: 1161-2014 Grade Y St-240).

Crane rails shall conform to IS: 3443-1980.

Collectors and down-comers shall be ERW410 pipes conforming to IS:3589-2001.

Roof and side sheeting shall be with 0.5mm BMT permanent colour coated metal sheets as per IS:15965-2012.

6.7.4 Method of Construction

Steel structures to be fabricated shall generally be of welded construction. Covered electrodes will conform to IS: 814–1991. Elements will be fabricated in largest possible dimensions optimal with the transport requirement so as to minimise site work. Site connection will be by permanent bolts.

6.7.5 Fabrication

Fabrication of all structural steel works shall be in accordance with IS:800. Fabricated structures shall conform to tolerance as specified in IS:7215–1974.

6.7.6 Inspection

All structures will be offered for inspection by the Contractor. Material certificate for the fabricated structures will also be provided.

6.7.7 Erection of Steel Structures

Erection of structures, alignment of all structures, tolerances for erection of steel structures shall be as per IS:12843–1989. Erection shall be carried out in accordance with IS:800.

6.7.8 Painting

Painting system to adopt shall be as follows:

Surface preparation: -– Blast cleaning shall be done by shot blasting as per Grade SA-2.5 according to Swedish Standard SIS055900.

Primer paint: Two coats of zinc phosphate in phenolic alkyd medium (DFT = 35 microns/coat).

Intermediate Paint: One coat of epoxy based MIO micaceous iron oxide (DFT =80 microns).

Finishing paint: Two coats of Polyurethane (DFT=50 microns/coat) after intermediate coat of paint.

Total DFT of paint after finishing shall be 250 microns.

6.8 ELECTRICAL FACILITY

6.8.1 Power requirement

The estimated power requirement of the proposed 9.0 MT Pellet Plant #2 is as follows:

Maximum Demand (MVA)	80
Annual energy consumption (10^6 kWH)	425

6.8.2 Source of Power Supply

Power requirement for the proposed Pellet Plant shall be made available from MSEB 220 kV Nagothane Grid Substation located approximately 30 km (by aerial route) from the proposed plant site.

Presently, Power from MSEB 220 kV Nagothane Grid Substation is being received at 220kV level at existing 220/33 kV GIS MRS sub-station of JSW through one 220 kV double circuit transmission line. Power at MRS is stepped down to 33 kV level by 180/210 MVA, 220/33/33 kV power transformers. Secondary & tertiary of 180/210 MVA, 220/33/33 kV power transformer is connected to 33 kV switchboard at MRS.

Power for the proposed Pellet Plant #2 shall be tapped from JSW's existing 33 kV switchboard located at 220/33 kV MRS sub-station to 33 kV switchboard located at new 33/6.6 kV Main sub-station (ESS-1) for Pellet Plant #2, which will be located approximately 3.0 km apart from the MRS.

The 33/6.6 kV Sub-station (ESS-1) near induration building is the main feeding sub-station for the Pellet Plant#2.

6.8.3 Power Distribution Scheme

Power requirement for the proposed Pellet Plant#2 shall be met from import from the MSEB 220 kV Nagothane Grid Substation.

Presently, Power from MSEB 220 kV Nagothane Grid Substation is received at 220kV level at existing 220/33 kV GIS MRS sub-station of JSW through One 220 kV D/C transmission line. Power at MRS is stepped down to 33 kV level by 180/210 MVA, 220/33/33 kV power transformer. Secondary & tertiary of 180/210 MVA, 220/33/33 kV power transformer is connected to 33 kV switchboard at MRS.

As described earlier, power for the proposed Pellet plant shall be tapped from existing 33 kV switchboard located at 220/33 kV MRS GIS sub-station to the new 33 kV switchboard located at proposed 33/6.6 kV Sub-station (ESS-1) near induration building of Pellet plant #2 area, located approximately 3.0 km apart from the MRS.

The 33/6.6 kV Main sub-station (ESS-1) near induration building is the main feeding sub-station for the entire Pellet Plant #2 complex. The power received at 33 kV shall be stepped down to 6.6 kV level by two nos. of 25/31.5MVA, 33/6.6kV power transformers at ESS-1 and two nos. of 25/31.5MVA, 33/6.6kV power transformers at ESS-3.

To cater the load of Pellet plant #2 area, following 4 nos. of HT cum LT sub-stations has been envisaged:

Sl. no.	Sub-station	Qty.	Major Tr. Capacity	Area covered
1	ESS-1	2 6	25/31.5 MVA, 33/6.6 kV 2 MVA, 6.6/0.433 kV	Fan, ESP, Screening
2	ESS-2	6	2 MVA, 6.6/0.433 kV	Day bin building & Wet grinding
3	ESS-3	2 12	25/31.5 MVA, 33/6.6 kV 2 MVA, 6.6/0.433 kV	Filtration, coarse additive storage yard, pump house, chiller plant, additive grinding ball mills
4	ESS-4	10	2 MVA, 6.6/0.433 kV	Additive grinding area, storage cum mixing, induration & balling.

The power distribution network shall comprises of 33/6.6 kV substations at ESS-1 & ESS-3 and 6.6 kV sub-station at ESS-4. For feeding the power supply to various 33 kV & 6.6 kV loads shops/ units, above mentioned 33/6.6 kV sub-stations have been envisaged, which shall be fed from 33 kV switchboard at MRS. From the 6.6 kV switchboard at ESS-1, ESS-3 & ESS-4, various HT & LT loads are fed by stepping down the voltage to LT level through 6.6/0.433 kV distribution substations.

Power factor compensation has been foreseen to achieve overall power factor in the region of 0.96 or better.

One 2000 KVA, 415 V DG set shall also be envisaged for feeding the emergency loads which shall be connected to emergency LT switchboard. Various emergency loads shall be fed from this emergency board.

The power distribution scheme envisaged for the proposed pellet plant is shown in the Single Line Diagram No. MEC/11/E1/Q7GK/FR/PP/03 (1 sheet).

6.8.4 Design Considerations

The power distribution network shall be designed as a radial system, with two alternative supply feeders to each load centre.

The design of power distribution system and selection of equipment shall be done based on the considerations of safety, reliability, ease of operation & maintenance as well as convenience of future expansion.

The equipment shall conform to relevant IS/IEC specifications and code of practice to meet the operational requirements and to ensure reliable and trouble free service in the plant.

Basic design parameters

Incoming Power supply	:	220 kV, 3 Ph, 50 Hz.
Distribution & Utilisation	:	33 kV & 6.6 kV, 3 Ph, 50 Hz
Motor rated above 250 kW	:	6.6 kV, 3Ph, 50Hz

Motors rated 250 kW & below and			
Other consumers		:	415 V, 3 Ph, 50 Hz
Illumination and small power		:	240 V, 1 Ph. 50 Hz
Control power supply	AC	:	240 V, 1 Ph, 50 Hz (+10% and -15%)
	DC	:	110 V (from battery), ± 10%

Voltage variations	:	
220 kV	:	± 10%
33 kV	:	± 10%
6.6 kV	:	± 10%
415 V	:	+ 10%, -15%

Frequency variations	:	± 5%

System earthing

- 220 kV	:	Effectively Earthed
- 33 kV	:	Resistance Earthed
- 6.6 kV	:	Resistance Earthed
- 415 V	:	Solidly earthed

Symmetrical short circuit rating for equipment design:

- 220 kV bus	:	40 KA for 3 seconds
- 33 kV bus	:	31.5 KA for 3 seconds
- 6.6 kV bus	:	40 KA for 3 seconds
- 415 V bus	:	50 KA for 1 second

6.8.5 Major Facilities

HT Switchgear

The 33 kV & 6.6 kV switchgear shall be indoor type sheet metal clad, draw out type comprising of VCB circuit breakers and provided with necessary protection, control gear, metering and audio-visual alarm annunciation system. The circuit breaker mechanism shall be mechanically and electrically trip free. The circuit breakers shall be electrically operated, stored energy type suitable for operation on 110 V DC control power supply.

415 V Switchgear

The 415 V switchboards shall comprise of air circuit breakers, in draw out design and multi tier formation. The switchboard shall have two bus sections and a bus coupler breaker with provision for auto changeover in the event of loss of power on any one bus section.

The circuit breakers shall be electrically operated and equipped with microprocessor / static type direct acting releases for over load and short circuit as well as earth fault protection.

All motor control centers (MCCs), large drives (above 75 kW) and power distribution boards (PDBs) shall be supplied power from the 415V switchboard. The 415 V switchgear shall confirm to relevant IS/IEC specifications.

Transformers

The transformers shall be copper wound, oil immersed, three phase and ONAN design. The maximum temperature at the rated output and at principal tap shall be 85°C for top oil by thermometer method and 95°C for winding by resistance method. Core shall be made of low loss CRGO silicon sheet. Transformer shall be capable of withstanding 40% over fluxing corresponding to rated voltage.

The winding shall be made of electrolytic grade copper and shall be vacuum dried. Inter turn and inter coil insulation shall be so designed that the di-electrical stress is distributed uniformly throughout the winding under all operating conditions.

To ensure reliable and trouble free operation, the transformers shall be designed to withstand short circuit on the secondary side for a duration of 5 seconds without any damage.

The 33/6.6 kV power transformers shall be provided with OLTC and local & remote control cubicles. Off circuit tap-changers shall be provided for 6.6/0.433 kV distribution transformers.

All the standard accessories such as conservator, breather, Buchholz relay, OTI, WTI, oil level gauge, valves, explosion vent etc. shall be provided for all the transformers.

The transformers shall conform to relevant IS/IEC specifications.

Cables

Power inside the plant shall be distributed through cables to various premises. Wherever necessary and where the cables are in small number, these will be directly buried underground. Wherever cables are in large number, concrete channels shall be used. GI pipes/ pipe blocks shall be used at road crossings and paved area.

Inside the substations and covered premises, the cables shall be laid in basement or in concrete channels (over cable supporting structures) or on columns and other available structures. Power cables shall be laid on ladder type GI cable trays, whereas control cable shall be laid on perforated cable trays.

All 11 kV cables shall be heavy duty, XLPE insulated, PVC sheathed multi core, aluminum conductor steel wire armoured and shall be suitable for unearthed system. All cables shall be FRLS type.

Cables for 415 V systems shall be heavy duty, 1.1 kV grade, PVC insulated PVC sheathed aluminum conductor, armoured / unarmoured as required.

The control cables shall be multi strand copper conductor, PVC insulated and PVC sheathed with minimum cross section of 2.5 sq.mm for voltage circuit and 4.0 sq. mm for current circuits.

The HT cables, LT power and control cable shall confirm to relevant IS/IEC specifications.

6.8.6 Shop Electrics

Power supply to all drives up to 75 kW and other loads operating at 415V, 3 phase, 50 Hz system is envisaged through motor control centers (MCCs). Drives beyond 75 kW shall be supplied power from 415 V switchboards comprising of air circuit breakers (ACBs).

The MCCs / PDBs shall be sheet steel enclosed and of modular, multi tier design. MCCs shall be in draw out execution whereas PDBs shall be in non-draw out execution. The enclosure class shall be IP-4X for switchboards installed inside switchgear room and IP-55 for boards installed at shop floors. The use of MCCBs / MCBs in general has been foreseen for power supply to small loads.

All motors shall have TEFC construction and provided with class F insulation with temperature rise limited to that permissible for class B insulation with enclosure class IP54/ IP55 as required. The motors generally shall be squirrel cage type suitable for direct on line starting.

Slip ring induction motors shall be considered for intermittent duty drives requiring frequent switching operations and for heavy duty applications requiring speed control

DC motors will be used for drives requiring frequent reversals, high starting torque wide range of speed and precise speed control.

Use of energy efficient drive motors shall be preferred in general.

6.8.7 Automation

The automation of operations shall be achieved through HMI system using Programmable Logic Controllers (PLCs) from the central control room of each unit. It shall be possible to operate any motor in Remote mode from the control room. To monitor the status of various drive motors, VDUs shall be provided in the control room.

The technological drives shall be grouped in logical control blocks, for the purpose of sequence of operations, monitoring and fault annunciation. Mimic display of the status of various drives is also foreseen.

6.8.8 Illumination

For supply of various illumination loads in the plant, provision of lighting distribution boards (LDBs) has been considered. These LDBs shall be installed in LT substation and shall be fed from the 415 V switchboards. LDBs shall supply power to the various sub-lighting distribution boards (SLDBs) installed in various buildings.

The internal illumination of low roof buildings shall be with fluorescent tube light fittings whereas shops as well as high roof building shall be illuminated with HPSV lamp fittings. Wherever high color rendering is required (low colour distortion), metal halide lamp fittings shall be used.

Average illumination level inside the shop building shall be 100-150 lux. However, the illumination level in control rooms shall be 300 lux.

Illumination in open yard and area illumination shall be provided with HPSV flood light fittings. The average illumination level shall be 15 to 30 lux for outdoor illumination.

The use of energy saving, high power factor lamp fittings shall be preferred.

6.9 FIRE FIGHTING FACILITY

6.9.1 General

Many working premises in a pellet plant have hazardous and fire prone environment. To protect the working personnel, equipment and machineries, adequate safety and firefighting measures have been planned for the proposed pellet plant.

6.9.2 Fire Protection Facilities

In order to combat any occurrence of fire in plant premises, the following fire protection facilities have been envisaged for the various units of the plant:

Portable fire extinguishers

All plant units, office buildings, stores etc. will be provided with adequate number of portable fire extinguishers to be used as first aid fire appliances. The distribution and selection of extinguishers will be done in accordance with the requirement of IS-15683:2006 & IS-2190:2010.

Hydrant System

A fire hydrant network system has been envisaged for the proposed plant. Internal hydrants will be provided at suitable locations and at different levels inside the major plant units. Yard hydrants will be provided normally along the road and in the close vicinity of the units to meet the additional requirement of water for extinguishing fire.

Clean Agent based Fire Extinguishing System

Clean Agent based firefighting system is a very effective measure to control Electrical Fires. It shall be provided in control rooms, substations, various other units. It shall be provided in all premises having sophisticated and expensive equipment. Clean agent is a gas mixture consisting of Inert gases. Clean agent based firefighting system shall be provided in areas including above false ceiling and below false floors of control room.

Nitrogen Purging System

Nitrogen purging system shall be provided for transformer having more than 10 MVA capacity or more than 2000 lt. oil capacity for protection against fire**.** Nitrogen purging system shall be of standard make like CTR/ SERGI system.

Automatic fire detection & alarm system

Unattended and vulnerable electrical premises like electrical control rooms, MCC, transformer rooms, switch gear rooms, oil cellars etc. will be provided with automatic fire detection and alarm system.

6.10 DG SET

To meet the emergency power requirement for the proposed pellet plant & equipment, one (1) number DG station of 2000 kVA has been envisaged. The fuel for DG set will be HSD.

DG set shall be of four stroke, radiator cooled, turbo charged diesel engine capable of driving synchronous generator to give rated output of 2000 kVA, at 0.8 lag pf at generator terminals with speed regulation +/- 1 % or less. The DG set shall be suitable for outdoor installation having automatic / manual start facility.

The diesel engine shall be multi-cylinder, radiator cooled, turbo charged, single acting, in line combustion with direct mechanical fuel injection. The DG set shall be capable to withstand 10 % overload for 1 hour, for a period of 12 hours operation. The engine shall be designed to burn HSD fuel having specific gravity 0.85 & conforming to IS:1460-1995 / equivalent.

The DG set shall be complete with control/ metering/ protection chargers and all accessories & auxiliaries like governor, flywheel with turning gear arrangement for hand cranking facility. The DG set shall be complete with suction filter cum silencer, inter-cooler, vibration damper, forced feed lubrication system with piston cooling, lube oil multistage filter, day storage fuel oil tank (990 litres), batteries with battery charger, all necessary instruments, controls and safety system. The DG station shall be provided with auto main failure (AMF) panel to start the DG set automatically. DG set shall be housed within an acoustic enclosure. DG set shall be equipped with exhaust gas pipe with silencer including exhaust hood & weather cowl, expansion joints, supporting structures, insulation, encasing pipes etc. DG set shall be installed over anti-vibration mounting pads to ensure isolation of vibration of rotating assemblies, enabling the set to be placed even on an uneven surface without any detrimental effects.

7. MANPOWER AND ORGANISATION STRUCTURE

7.1 Organisational structure

The proposed organisational structure takes into account the organisational practices prevailing in similar plants.

The plant will be headed by Vice president. General Manager (GM - Operation, Maintenance, Electrical), Dy. General Manager (DGM - Quality, Personal, Accounts, Logistics, Purchase, Commercial, Stores) will directly report to him. DGM will be assisted by Sr. Managers, Managers, Dy. Managers.

7.2 Manpower

The requirement of manpower for the operation and maintenance of the proposed pellet plant with associated facilities has been estimated taking into consideration the following:

- Capacity of the pellet plant complex
- Types of equipment to be installed
- Degree of automation envisaged
- Number of operating shifts to achieve the rated capacity
- Requirement of personnel as off and leave reserve etc.

The overall manpower requirement for the pellet plant including the general administration personnel has been estimated at 409.

Apart from operational and maintenance (mechanical and electrical), the proposed manpower also includes preventive maintenance and shut down requirements.

A summary of category-wise manpower requirements for the pellet plant is indicated below:

Category-wise

Executives including managerial staff	-	84
Supervisors / technicians	-	212

Labour / House-keeping	-	113
Total		**409**

7.3 Recruitment

Top executives like GM, DGMs and a few key personnel of other categories shall have to be recruited to take necessary advance actions for project construction.

Some of the construction personnel can progressively be absorbed with the tapering of the construction work, particularly in the maintenance and services areas of the plant. A certain portion of junior executives and supervisory staff have to be recruited / placed during the construction stage itself as acquaintance with equipment erection will be very much beneficial for them in running the plant units later on.

7.4 Training

The executives of various categories are to be trained mostly in the operation and maintenance of the pellet plant of similar type and capacity. They, in turn, would share the technical knowledge attained during the training with their colleagues and sub-ordinates. At least 3-4 months before the commissioning of the project, these employees ought to complete their training and be associated with the commissioning activities of the plant.

8. PROJECT IMPLEMENTATION

8.1 General

The project envisages installation of new pellet plant #2 near their existing pellet plant #1 to produce BF grade pellets at Dolvi.

The project has been planned to be completed in 22 month from "Zero date" which is reckoned as "Placement of order on Technological Supplier''.

However, the execution of the proposed project would call for meticulous planning, monitoring and control during engineering, procurement and construction stage. Salient aspects relating to project implementation strategy are covered in this chapter.

8.2 Implementation Schedule

The overall implementation schedule for the project, taking into account the facilities proposed, is given in drawing no. MEC/11/PY/Q7GK/FR/PP/04 (R-0). According to the schedule, the overall project will be commissioned in 22 months from zero-date.

8.3 Implementation Plan

With the "zero-date", it is planned to complete basic engineering within 9 months. Technical specification for long delivery items has been planned to issue within 8th month and other items within 12 months. Vender drawing approval for long delivery and major items has been planned to be completed within 12th month and other items within 15th month. The civil engineering has been planned to start from 4th month onwards so that sufficient drawings can be made available before start of the civil work. The civil work for plant construction has been planned to start from 5th month onwards.

The structural engineering has been planned to start from 3rd month and completed within 14th month. The structural supply is planned to start from 7th month and completed within 18th month, so that the structural

erection can be started from 8th month onward and shall be completed by 19th month.

It is envisaged that the supply of plant and equipment at site shall start from 10th month and shall be completed by 19th month. Accordingly, the equipment erection shall commence from 11th month and is expected to be finished by 20th month.

The testing, trial run and commissioning of proposed pellet plant has been planned to be taken up progressively from 19th month to 22nd month as shown in the schedule.

8.4 Advance Actions

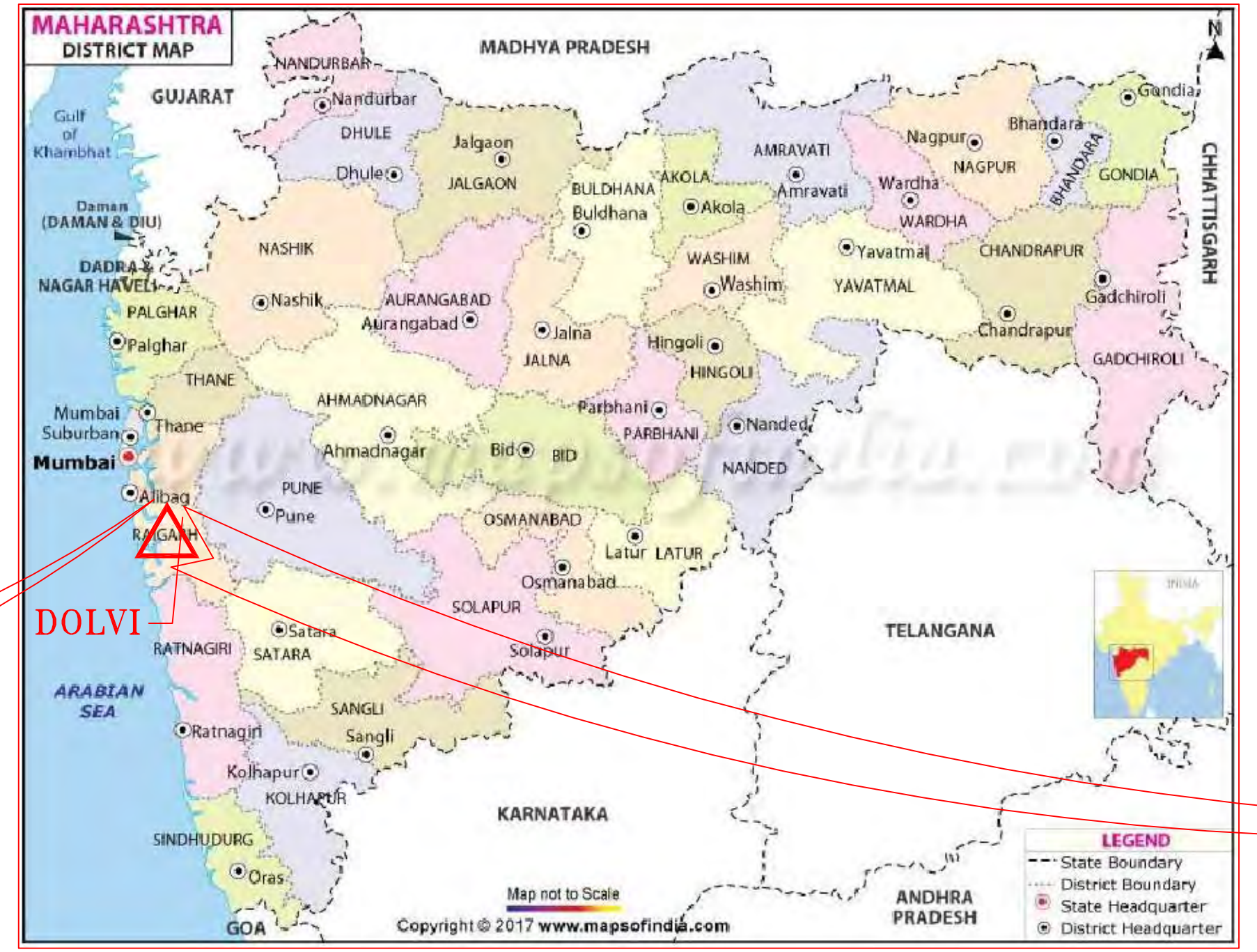
In addition to the above, it will be imperative to complete many of the activities prior to zero-date of the project. These shall include the following:

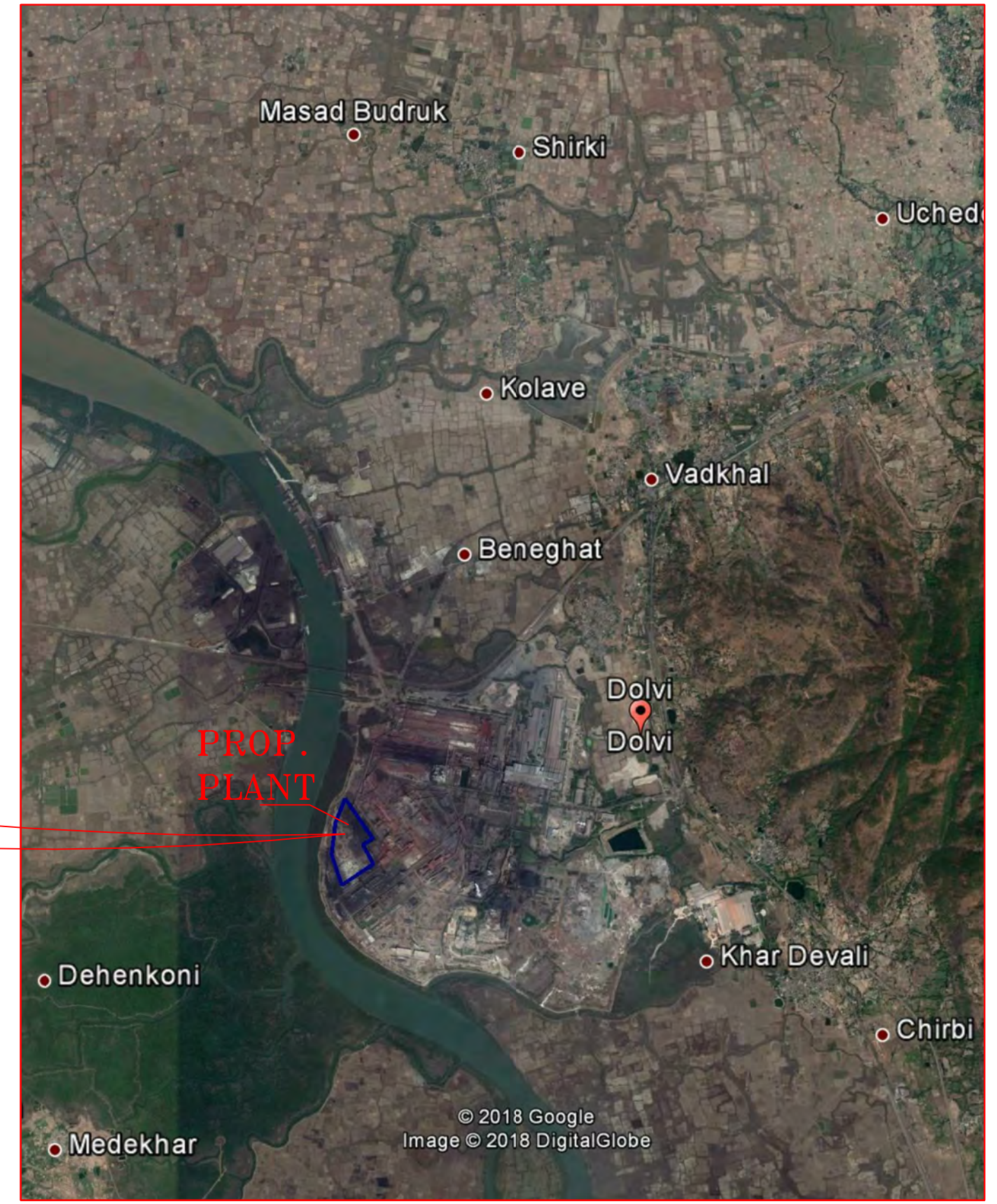
- Preparation & issue of tender document for main technological unit,
- Action for placement of order for main technological unit,
- Financial tie-ups, if any,
- Finalization of terms with overseas agencies, if any,
- Statuary Clearance,
- Soil investigation,
- Actions for enabling works like construction of water line, power line, sewerage, etc.,
- Site leveling,
- Advance action to be taken to ensure availability of construction material and construction manpower.

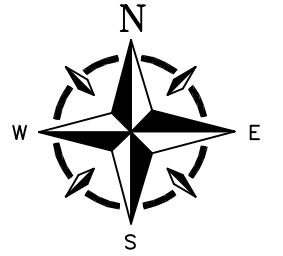
In order to adhere to this schedule for timely completion of the project, following points shall have to be taken care of:

- Simultaneous working in many fronts,
- Selection of capable and reputed construction and erection agencies,
- Mobilization of requisite resources of men, materials and construction machinery,

- High levels of mechanization for construction and erection work,
- Proper planning for movement of construction equipment and material,
- Timely availability of site infrastructure in terms of water, electric power etc.,
- Adoption of advanced methods of construction and erection.







SYMBOL LEGEND

PROPOSED PLANT SITE

JSW Steel	JSW STEEL LIMITED Dolvi Works FR For Pellet Plant–2 at Dolvi, Maharashtra
MECON	मेकॉन लिमिटेड MECON LIMITED

SECTION	GL&T
LOCATION	RANCHI
DESIGNED	NILENDU
DRAWN	NILENDU
CHECKED AND VERIFIED	USR
APPROVED	

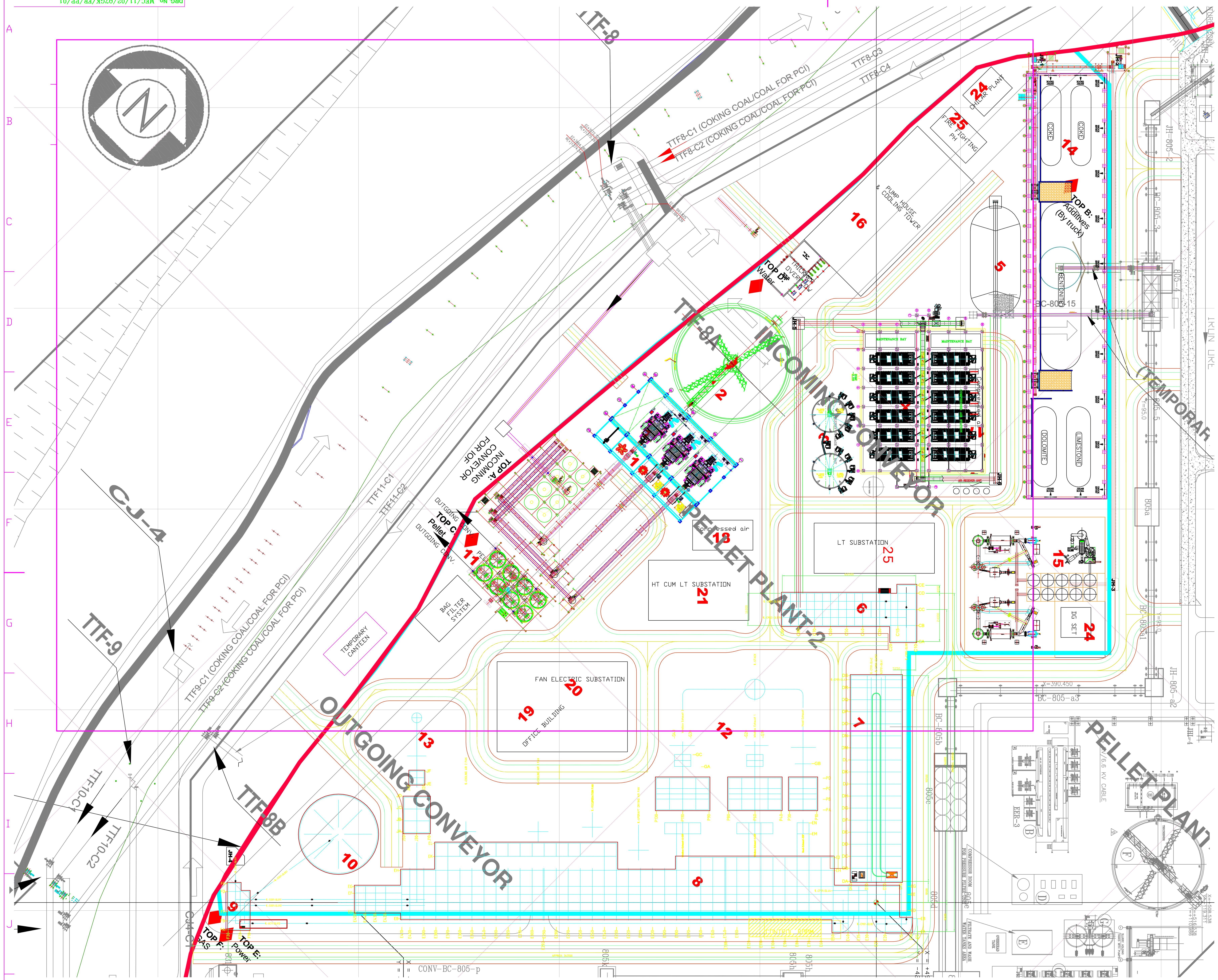
LOCATION MAP

SCALE – NTS | SHEET 1 OF 1 | Rev. 0

DRG. No. MEC/11/14/07GK/001

REFERENCES | DRG. NO.

REV.NO. | DATE | ZONE | DESCRIPTION | BY | VERIFIED



UNIT

1. Wet Grinding including Bin storage
2. Thickener
3. Slurry storage tank
4. Filtration
5. Emergency filter cake stock pile
6. Dosing & Mixing
7. Balling including electrical sub-station
8. Induration
9. Screening
10. Emergency pellet stock pile
11. Pellet bin storage
12. Process gas handling
13. Plant dedusting
14. Coarse additive Ground storage unit
15. Coarse additive bin storage unit & additive grinding unit
16. Pump house & cooling tower
17. Compressed air station for filter press
18. Plant compressed air
19. Office building
20. Fan electric sub-station
21. HT cum LT sub-station
22. Chiller plant
23. Fire fighting pump house
24. DG Station
25. LT Substation
26. Bag filter based dedusting system for product pellet bin storage

TOP : ◆

A. Incoming IOF
B. Additives
C. Outgoing Pellet
D. Water
E. Power
F. Gas

FOR REPORT PURPOSE ONLY

JSW Steel Limited,
GEETAPURAM, DOLVI, TAL. PEN, DIST. RAIGAD, MAHARASHTRA

FEASIBILITY REPORT

मेकॉन लिमिटेड
MECON LIMITED

NOTES.
1. ± 0.00M CORRESPONDS TO +4.00M (M.S.L.) WHICH IS FINISHED FLOOR LEVEL (F.F.L.)

SCALE	1:1000	DATE
DSGND. BY	AKP/PK	
DRAWN BY	PK	
CHKD. BY	AKP/KS	
APPVD. BY	SKB/SB	

OVERALL LAYOUT OF PELLET PLANT #2 (PRELIMINARY)

SHT. SIZE A1

JOB No. | DRG. No. MEC/11/02/Q7GK/FR/PP/01 | SHEET: 1 OF 1 | REV.0

SUBMITTED FOR | APPROVAL | INFORMATION | REFERENCE | RECORD | CONSTRUCTION

REFERENCES | DRAWING NUMBER

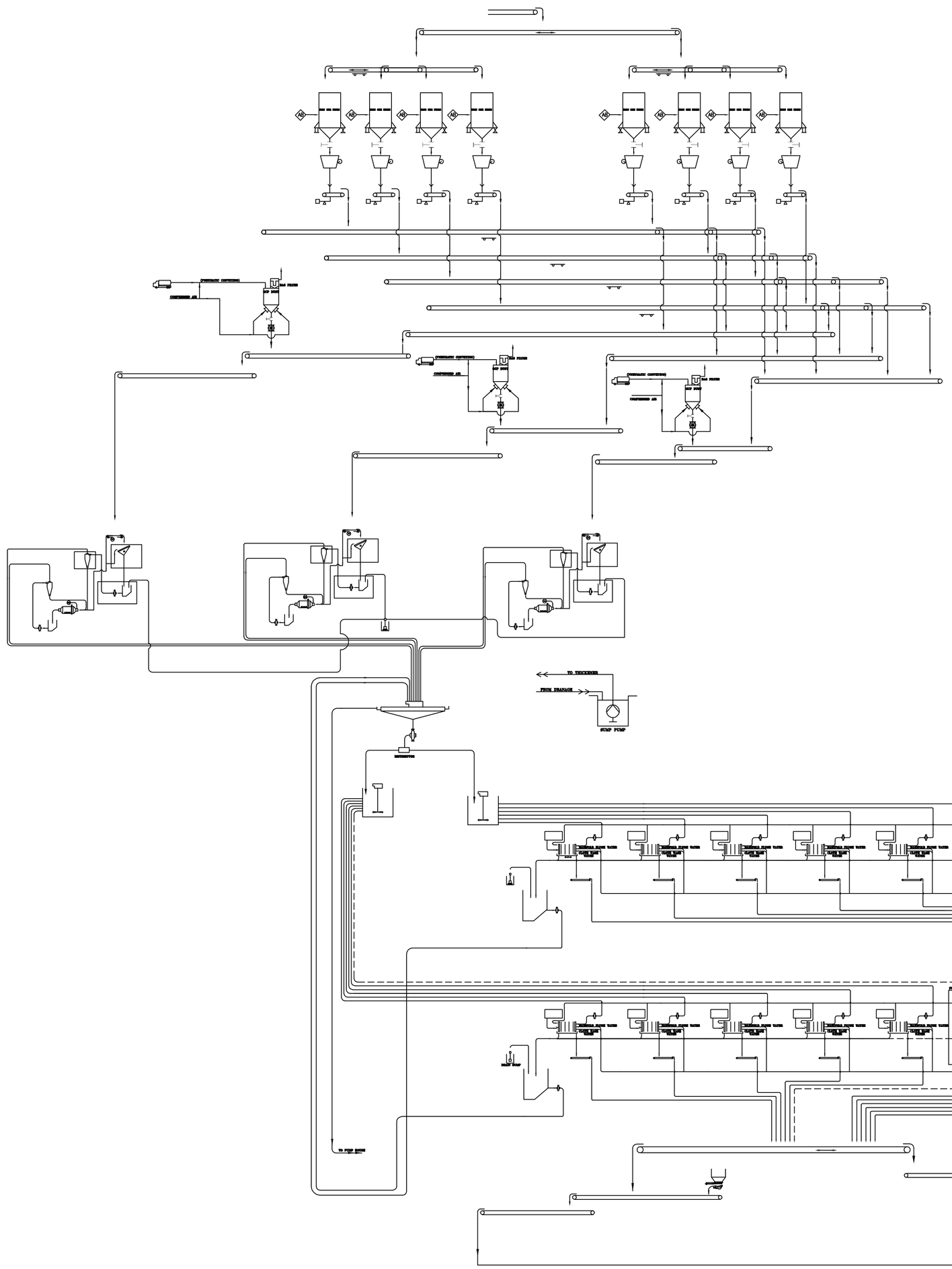
REV.	DATE	ZONE	DESCRIPTION	BY	VERIFIED
0					

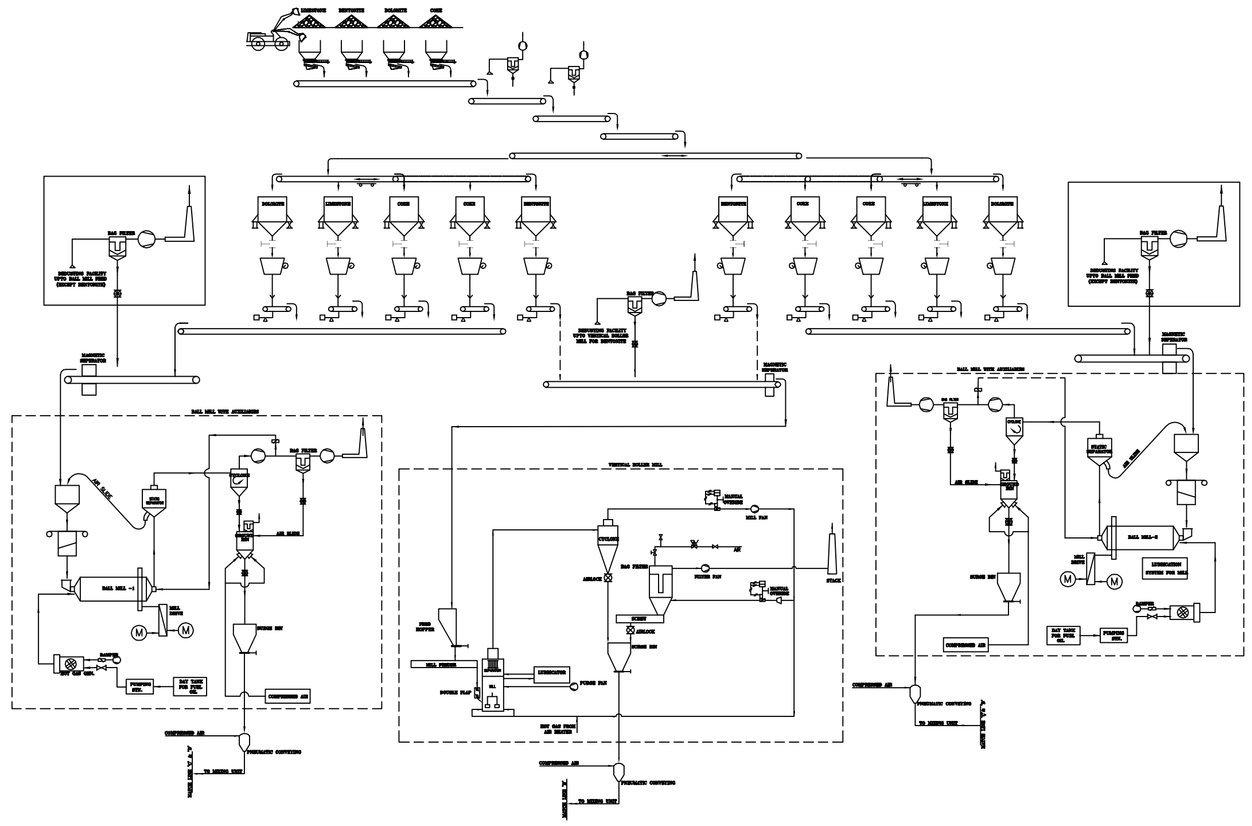
REVISION

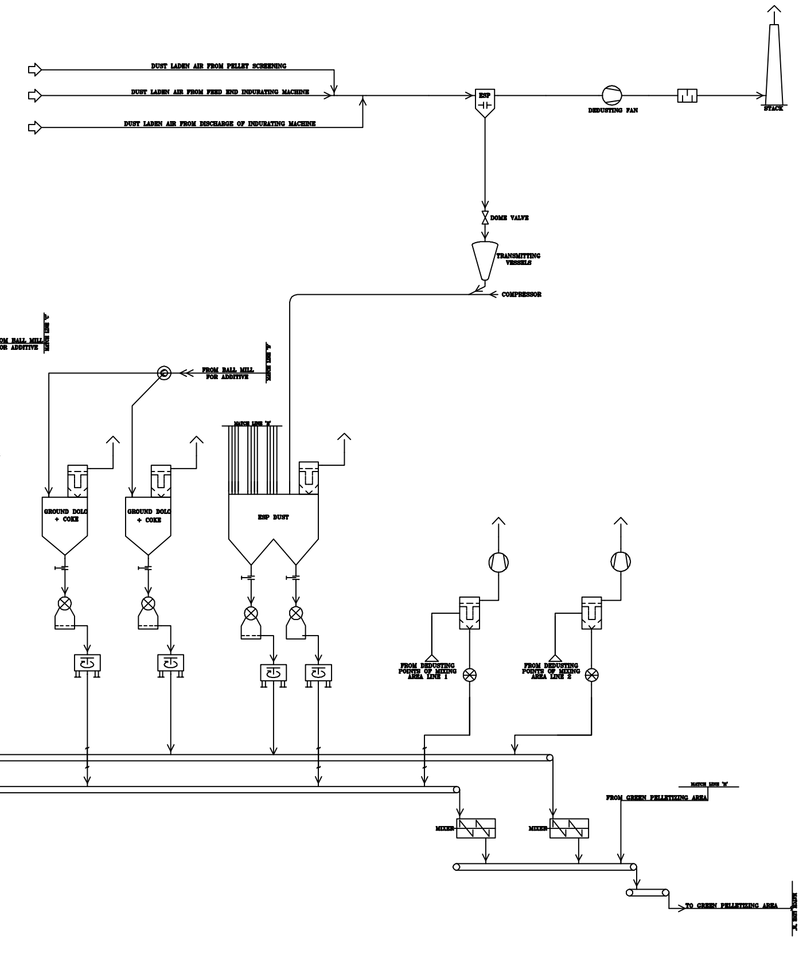
CONCURRED BY.

DRG. No. MEC/11/02/Q7GK/FR/PP/01

DRG. NO. MEC/11/02/07GK/FR/PP/02







FOR REPORT PURPOSE ONLY

JSW Steel Limited, Dolvi Works
GEETAPURAM, DOLVI, TAL. PEN, DIST. RAIGAD, MAHARASHTRA

मेकॉन लिमिटेड
MECON LIMITED

SCALE	1:200		PELLET PLANT #2
DSGND. BY	AKP/KS		
DRAWN BY	Subrata		
CHKD. BY	AKP/KS		
APPVD. BY	SKB/KB		TITLE: PROCESS FLOW SHEET
	SHT. SIZE A1		DRG.No. MEC/11/02/Q7GK/FR/PP/02 SHEET: 1 OF 2 REV. 0
DATE :	June'18		
SUBMITTED FOR	APPROVAL	INFORMATION / REFERENCE / RECORD / CONSTRUCTION	

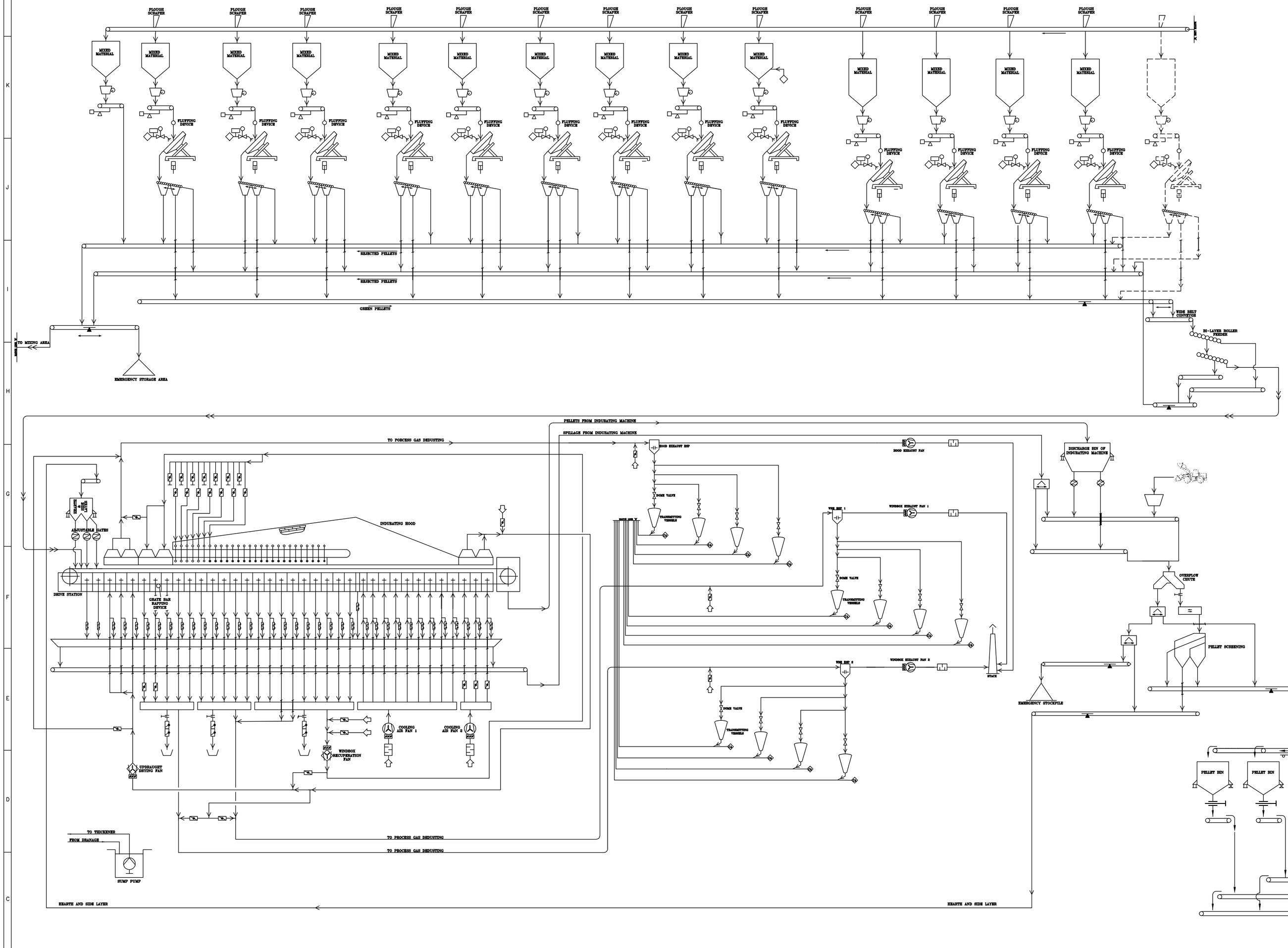
REFERENCES DRG. NO.

REV.NO.	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISIONS		

NOTES:–

REV. / SEC.	CONCURRED BY

DRG. NO. MEC/11/02/Q7GK/FR/PP/02



FOR REPORT PURPOSE ONLY

NOTES:–

CONCURRED BY

REV. NO.	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISIONS		

REFERENCES — DRG. NO.

JSW Steel Limited, Dolvi Works

GEETAPURAM, DOLVI, TAL. PEN, DIST. RAIGAD, MAHARASHTRA

मेकॉन लिमिटेड
MECON LIMITED

SCALE	1:200
DSGND. BY	AKP/KS
DRAWN BY	Subrata
CHKD. BY	AKP/KS
APPVD. BY	SKD/SB
SHT. SIZE	A1

PELLET PLANT #2

TITLE: PROCESS FLOW SHEET

DRG.No. MEC/11/02/Q7GK/FR/PP/02 SHEET: 2 OF 2 REV. 0

DATE :	June'18				
SUBMITTED FOR	APPROVAL	INFORMATION	REFERENCE	RECORD	CONSTRUCTION

DRG.NO.MEC/11/E1/Q7GK/FR/PP/03

ESS-1

ESS-2

ESS-3

ESS-4

FROM 33kV SWBD AT 220/34.5 kV, MRS SUBSTATION

FROM 33kV SWBD AT 220/34.5 kV, MRS SUBSTATION

33kV,2500A,3Ph,50HZ, 31.5kA (FOR 3 Sec)

33kV,2500A,3Ph,50HZ, 31.5kA (FOR 3 Sec)

CICD 1250A,VCB 31.5KA/3S

CICD 1250A,VCB 31.5KA/3S

CICD 1250A,VCB 31.5KA/3S

CICD 1250A,VCB 31.5KA/3S

CICD 1250A,VCB 31.5KA/3S

PCC 1 TYPICAL

PCC 2 TYPICAL

PCC 3 TYPICAL

PCC 4 TYPICAL

PCC 5 TYPICAL

PCC 6 TYPICAL

PCC 7 TYPICAL

PCC 8 TYPICAL

PCC 9 TYPICAL

PCC 10 TYPICAL

PCC 11 TYPICAL

PCC 12 TYPICAL

PCC 13 TYPICAL

PCC 14 TYPICAL

PCC 15

PCC 16

PCC 17

L E G E N D

SYMBOL	DESCRIPTION
A	AMMETER WITH SELECTOR SWITCH
V	VOLTMETER WITH SELECTOR SWITCH
46	NEUTRAL UNBALANCE RELAY
27	UNDER VOLTAGE RELAY
50	INSTANTANEOUS O/C RELAY
51	INVERSE TIME O/C RELAY
50N	INST. EARTH FAULT RELAY
51N	INVERSE TIME E/F RELAY
97	FUSE FAILURE RELAY
12	OVER FREQUENCY RELAY
51G	STANDBY EARTH FAULT RELAY
87B	BUSBAR DIFFERENTIAL RELAY
59	OVER VOLTAGE RELAY
2	TIMER (FOR LV RELAY)
85	PILOT WIRE PROTECTION RELAY
67	DIRECTIONAL OVERCURRENT RELAY
67N	DIRECTIONAL EARTH FAULT RELAY
87T	TRANSFORMER DIFFERENTIAL RELAY
MFM	MULTIFUNCTION METER

ISOLATOR

MOTOR OPERATED DOUBLE BREAK ISOLATOR WITH 2 Nos. MANUAL EARTH SWITCH

MOTOR OPERATED DOUBLE BREAK ISOLATOR WITH SINGLE MANUAL EARTH SWITCH

MOTOR OPERATED DOUBLE BREAK ISOLATOR WITHOUT EARTH SWITCH

CIRCUIT BREAKER (DRAWOUT TYPE)

CIRCUIT BREAKER (NON DRAWOUT TYPE)

POWER TRANSFORMER

POTENTIAL TRANSFORMER

CURRENT TRANSFORMER

FUSE

EARTHING TRANSFORMER

GENERATOR

LIGHTING ARRESTER

NOTES:-

1. BUS PT SHALL BE PROVIDED IN EACH OF THE BUS SECTION OF 33kV SWITCH BOARD.

For FR purpose only

JSW Steel Limited, Toranagallu

GEETAPURAM, DOLVI, TAL. PEN, DIST. RAIGAD, MAHARASHTRA

मेकॉन लिमिटेड

MECON LIMITED

REV. NO.	DATE	ZONE	DESCRIPTION	BY	VERIFIED
			REVISIONS		

REFERENCES DRG. NO.

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SECTION	ELECTRICAL-E1
LOCATION	RANCHI
DESIGNED	K TUDU
DRAWN	K TUDU
CHECKED AND VERIFIED	DK Singh
APPROVED	V KAPILA
DATE	MAY 18

PELLET PLANT # 2

POWER DISTRIBUTION SCHEME SINGLE LINE DIAGRAM 33kV, 6.6kV & 415V SYSTEM

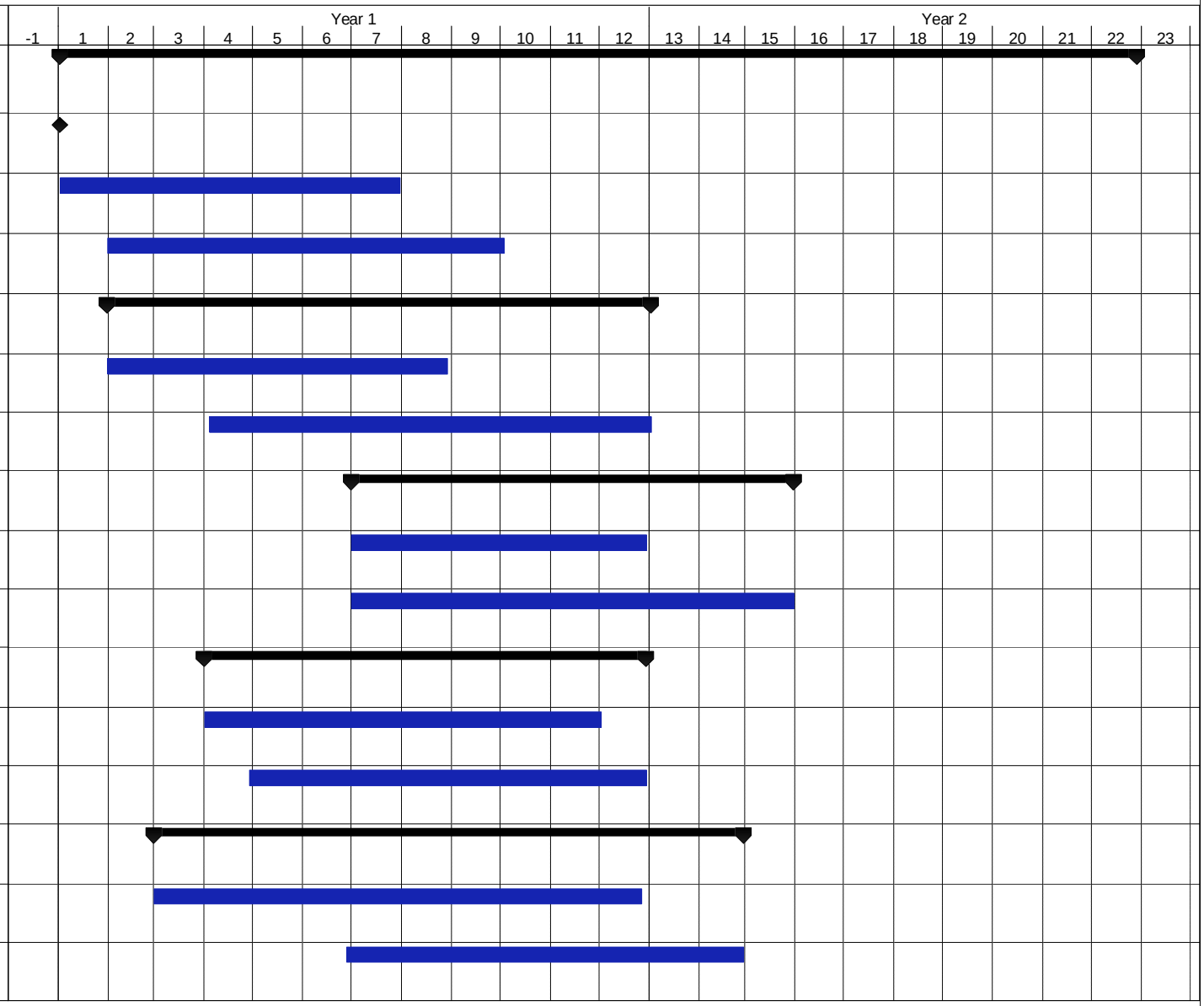
SCALE - NTS | SHEET 1 OF 1 | REV. 0

DRG.NO.MEC/11/E1/Q7GK/FR/PP/03

CONCURRED BY

JSW, DOLVI WORKS
PELLET PLANT NO.2
PROJECT IMPLEMENTATION SCHEDULE

ID	Task Name	Dur(w)
1	**JSW, Dolvi Works - Pellet Plant-2**	**95 w**
2	**Effective date of Contract (Zero-date)**	**0 w**
3	**Basic data/ Basic Engineering (by JSW/TS)**	**30 w**
4	**Basic Engineering**	**35 w**
5	**Issue of technical specification**	**48 w**
6	Long delivery items	30 w
7	Other items	39 w
8	**Vendor drawings approval**	**39 w**
9	Long delivery and major items	26 w
10	Other misc. items	39 w
11	**Civil Engineering**	**39 w**
12	Major building foundation	35 w
13	Major equipment foundation	35 w
14	**Structural engineering**	**52 w**
15	Major technological building structures	43 w
16	Other Misc. structures	35 w



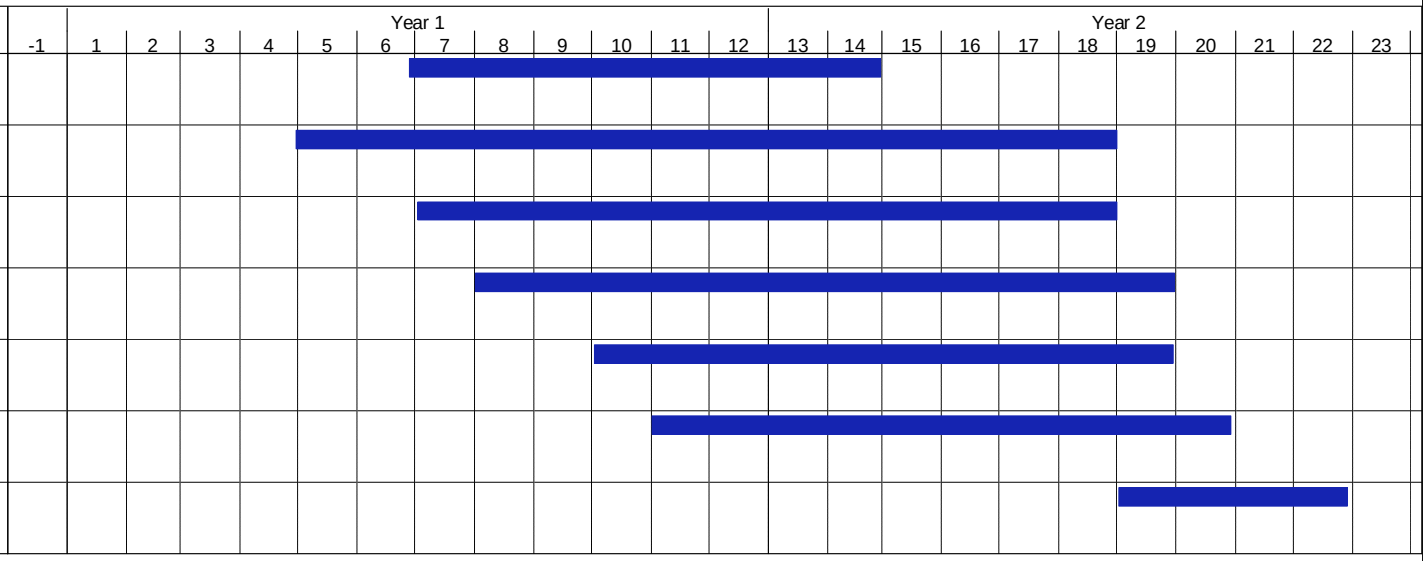
FR_JSW_Dolvi_Pellet plant 2

Task Milestone Summary

Drg No. MEC/11/PY/Q7GK/FR/PP/04 (R-0)

JSW, DOLVI WORKS
PELLET PLANT NO.2
PROJECT IMPLEMENTATION SCHEDULE

ID	Task Name	Dur(w)
17	**Engineering related to tech. structures/process equipment**	**35 w**
18	**Civil works**	**61 w**
19	**Structural supply**	**52 w**
20	**Structural erection**	**52 w**
21	**Supply of Equipment & tech. structure**	**43 w**
22	**Erection of plant & Equipment**	**43 w**
23	**Testing, Trial Run & Commissioning**	**17 w**



FR_JSW_Dolvi_Pellet plant 2

Task Milestone Summary

Drg No. MEC/11/PY/Q7GK/FR/PP/04 (R-0)