PRE-FEASIBILITY REPORT

ON

THE CAPACITY EXPANSION OF STAINLESS STEEL PRODUCTION FROM 0.8 TO 2.2 MTPA IN JAJPUR DISTRICT, ODISHA

TO

JINDAL STAINLESS LIMITED

MAY 2018
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1 - EXECUTIVE SUMMARY

This Summary presents a brief outline of the Pre-feasibility report for the proposed plan for expansion of the existing integrated iron and steel making facilities of Jindal Stainless Limited (JSL) & Jindal United Steels Limited (JUSL) at Kalinganagar Industrial Complex, District Jajpur, Odisha.

1. JSL and JUSL presently operate a 1.6 MTPA stainless steel plant in Kalinganagar Industrial complex, Odisha. Environmental Clearance for this project was accorded by Ministry of Environment Forest and Climate Change (MoEFCC) on 1st November 2007 for production of 1.6 MTPA rolled stainless steel. CTO was obtained from State Pollution Control Board of Odisha for production of 0.8 MTPA crude stainless steel and 1.6 MTPA rolled product.

2. Now after demerger of JSL into JSL, JUSL & JCL, JUSL would own the Hot Strip Mill and the proposed Cold Rolling Mill whereas JSL would own the rest of the facilities except coke ovens which would be owned by JCL. Now it is planned to expand the plant for a total production of 3.2 MTPA rolled stainless steel, through increase in capacity of individual units and installation of new units in the existing plant site.

3. The production plan of JSL after the proposed expansion is as follows:

<table>
<thead>
<tr>
<th>Product</th>
<th>Capacity (MTPA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Stainless Steel</td>
<td>2.20</td>
</tr>
<tr>
<td>Hot rolled product</td>
<td>0.680</td>
</tr>
<tr>
<td>Cold rolled product</td>
<td>0.864</td>
</tr>
</tbody>
</table>
4. The proposed production of liquid steel and subsequent casting would be accomplished via Electric Arc Furnace (EAF)-AOD-Slab Caster route. The production facilities would be adequately supported by necessary auxiliary facilities such as raw materials unloading and storage, proportioning of raw materials, electric power receiving and distribution stations, various utility facilities, water treatment and distribution system, etc. The list of facilities after the proposed expansion would be as follows:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Unit</th>
<th>Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SMS</td>
<td>2 x 150 t EAF converters (upgradation of existing 100 t converters)</td>
</tr>
<tr>
<td>2</td>
<td>Secondary refining</td>
<td>1 x 150 t LF (upgradation of existing 120 t)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x 150 t LF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x 150 t AOD (upgradation of existing 120 t)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x 150 t AOD</td>
</tr>
<tr>
<td>3</td>
<td>Caster Shop</td>
<td>1 x 1 - Strand slab caster (existing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x 1 – Strand slab caster</td>
</tr>
<tr>
<td>4</td>
<td>CRM</td>
<td>HAPL - 1 x 0.8 MTPA (existing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x 0.8 MTPA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAPL - 1 x 0.45 MTPA (existing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x 0.45 MTPA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Finishing Lines (Slitting, Cut to length, Skin pass mill etc.)</td>
</tr>
<tr>
<td>5</td>
<td>Air Separation Plant</td>
<td>1 x 425 TPD (Existing)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 x 425 TPD (BOO Basis)</td>
</tr>
<tr>
<td>6</td>
<td>Lime/Dolo Calcination</td>
<td>1x450 TPD+ 1x600 TPD (Lime &amp; Dolo) + 200 TPD Hydrated Lime Plant (BOO Basis)</td>
</tr>
<tr>
<td></td>
<td>Plant (BOO basis)</td>
<td>(New)</td>
</tr>
<tr>
<td>7</td>
<td>Ferro Alloy Plant</td>
<td>0.25 MTPA(2 x 60 MVA + 3 x 27.6 MVA); 13 MW WHRB with 50 TPH AFBC Boiler;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Briquette Plant - 180TPH</td>
</tr>
<tr>
<td>8</td>
<td>Metal recovery Plant</td>
<td>1x 50 TPH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1x80 TPH (BOO Basis)</td>
</tr>
</tbody>
</table>

5. The proposed site for the expansion of the steel plant is located within the Kalinganagar Industrial Complex (KNIC) in Jajpur district of Odisha and is owned by JUSL and JSL. The Daitari-
1 - Executive summary (cont’d)

Paradeep expressway, also designated as NH-5A, is situated on the west and NH-215 on the northern side which connects the plant site to J K Road. Kalinganagar Industrial Complex has received status of National Investment & Manufacturing Zone (NIMZ) from Ministry of Commerce & Industry, Department of Industrial Policy & Promotion (DIPP), Government of India under NIMZ Scheme. As per the Clause 18 of NIMZ guidelines, Environment Clearance for industries within NIMZ would be given high priority.

6. The total make-up water requirement for the combined expansion of JSL and JUSL will be around 1170 cu m/hr. The source of water for the existing steel plant is river Brahmani from where raw water is pumped and stored in a raw water storage tank. Water for the proposed plant is considered to be available from existing raw water reservoir on a continuous basis.

7. The estimated power requirements of the combined expansion of JSL and JUSL including utilities and auxiliary facilities for the project would be about 965 Million KWh, which would be sourced from existing captive generation and Grid Power supply system.

8. The total area available for the plant is around 786 acre. This area is adequate to accommodate the expansion facilities, including process units, water reservoir, solid waste processing area and 33% greenbelt.

9. The proposed production facilities would generate various pollutants in form of air emission, wastewater discharge, solid waste, etc, which would be managed by adopting state-of-art technologies, installation of control devices and treatment plants and by maximum recycling/reuse of the wastes, wherever applicable.
1. Executive summary (cont'd)

10. JSL has established benchmark with regard to its social responsibility towards the community and has undertaken extensive range of initiatives in the sphere of (i) livelihood & employability (ii) education (iii) health (iv) local infrastructure development (vi) ethnicity. The augmentation and extension of the above mentioned initiatives would extend to the local people of the study area. The focus is aimed at the local scheduled tribe and schedule caste groups.

11. It is envisaged that the project would be completed in a period of 36 months from receiving Environmental Clearance. It is considered that construction work at site for various plant facilities of the project would commence after completion of major engineering works.

12. The order-of- magnitude capital cost of the plant would be about Rs 1,444 crore. This includes Plant and equipment (as erected) including civil and structural work, Design, engineering and administration during construction and contingency costs.

13. It is also expected that the proposed expansion project would augment the existing social developmental activities and further promote - i) Improvement in the socio-economic status of the region by generation of direct and indirect employment opportunities, ii) Development of ancillary small and medium industries, trade & commercial establishments and local entrepreneurship.
2 - INTRODUCTION OF THE PROJECT

IDENTIFICATION OF THE PROJECT AND PROJECT PROPONEENT

India is the 3rd largest producer of crude steel globally with a total Finished Steel Production of around 90 MTPA (Million Tons per Annum) in the year 2015-16. With immense encouragement from the Government and its pro-active approach, steel industry is looking forward to a better & flourishing future.

Founded by Shri O.P Jindal in 1970, Jindal Stainless Limited (JSL) is one of the largest stainless steel conglomerates in India and ranks amongst the top 10 stainless steel conglomerates in the world. Subsequently JSL has demerged to form three companies viz. Jindal United Steel Limited (JUSL) comprising of Hot Strip Mill (HSM) with Plate Finishing Shop (PFS), Jindal Coke Limited (JCL) comprising of Coke Ovens and its By-Product Plant (COBP) and JSL containing the rest of the facilities.

Now JSL & JUSL are planning to expand their plant capacities to achieve an integrated production of 3.2 MTPA stainless steel.

Brief Description of the Nature of the Project

The brief profile of the project after expansion of JSL would be as follows:

- Crude Liquid Steel .. 2.2 MTPA
- Hot & Cold Rolled Stainless Steel .. 1.6 MTPA

The proposed production of liquid steel and subsequent casting & rolling would be accomplished via Electric Arc Furnace (EAF)-AOD-LF-Slab Caster route. The project falls under category A, Section 3 (a) of EIA Notification September 2006 and amendment thereof vide Notification No. S.O 3067 (E) dated 1st December 2009.
The following table depicts the comparison between the production figures for JSL as per existing EC for 1.6 MTPA against the proposed 2.2 MTPA stainless steel plant.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Plant Capacity</th>
<th>1.6 MTPA</th>
<th>2.2 MTPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Steel Making</td>
<td>0.8</td>
<td>2.2</td>
</tr>
<tr>
<td>2.</td>
<td>Cold Rolling Mill</td>
<td>0.8</td>
<td>1.6</td>
</tr>
</tbody>
</table>

**NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY**

Stainless steel is used for manufacture of numerous domestic appliances and industrial equipment and consequently there is a consistent demand for stainless steel. The proposed project would expand the production of stainless steel based on utilization of the readily available raw materials in Odisha.

There is potential to increase per capita steel consumption in India since India currently uses 1.9 kg per person against World average of 6 kg.

Major factors which carry the potential of raising the per capita stainless steel consumption in the country are listed below:

i) Consistently increasing demand for domestic/houseware products

ii) Manufacturing growth driven by Make-in-India initiative and use of stainless steel in automotive and railways

iii) Increase in urban population to 600 million by 2030,

iv) Potential for big volume exports of process equipment in the future
Hence, the proposed expansion of stainless steel production is appropriate in the current context of Indian economic & export dynamics and would also cater to the increasing demand in the domestic market.

**DEMAND-SUPPLY GAP, IMPORTS VS. INDIGENOUS PRODUCTION, EXPORT POSSIBILITY & DOMESTIC/EXPORT MARKETS**

The Indian stainless steel crude production has been rising very fast, especially since 1990, when CrMn steel production started to take off. The development of CrMn steels in India was triggered by high nickel prices and a lack of domestic availability.

The production of stainless steel in India was about 3.7 MT in the year 2015-16, which was about 3.6% of country's steel production. India is the third largest producer and second largest consumer of stainless steel in the world. Domestic production of stainless steel increased from a modest 25 KT in 1975-76 to almost 2.8 MT in 2014-15, at an ACGR of 12.5% per annum. India is set out to continue its rapid development supported by industrialization, urbanization and a “Make in India” economic policy. The potential for growth of stainless steel market is enormous considering that India, with a consumption of 1.9 kg per capita, lags far behind the global consumption of 6 kg per capita. With regards to demand, an ACGR of 9.7% has been recorded for the period 2010-11 to 2014-15 and it is projected that the growth rate to 2024-25 would continue to be around 8.5%.

The import-export statistics of India for the year 2015-16 is as tabulated below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Import, ‘000 T</th>
<th>Export, ‘000 T</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-16</td>
<td>545</td>
<td>413</td>
</tr>
</tbody>
</table>
2 - Introduction of the Project (cont’d)

The current domestic consumption pattern of stainless steel end products is presented in Fig 2-1.

![Figure 2-1 - Domestic Consumption Pattern of Stainless Steel](image)

**FIG. 2-1 - DOMESTIC CONSUMPTION PATTERN OF STAINLESS STEEL**

Current overall SS exports are about 0.4 MT. However, there are potential for big volume exports of process equipment in the future. There have been very high domestic and Foreign Direct Investments pumped in the real estate sector over the last couple of years and the process to continue in the future too, even considering the current setback, which in turn would promote exports.

**EMPLOYMENT GENERATION DUE TO THE PROJECT**

In the construction phase of the proposed expansion project both direct and indirect deployment of local manpower would be facilitated. The nature of the employment opportunities would involve contractual & casual labour for semi-skilled & unskilled labourers and regular employment for skilled locals. The proposed expansion would indirectly promote the development of ancillary industries and allied indirect employment opportunities. As a whole, the project would generate source of income which in turn shall contribute to the local economy and lead to diversification of skills.
3 - PROJECT DESCRIPTION

TYPE OF PROJECT INCLUDING INTERLINKED PROJECT

The proposed expansion project is for production of 2.2 MTPA stainless steel slabs, 0.86 MTPA Cold rolled stainless steel and 0.68 MTPA hot rolled stainless steel by installation of new facilities as well as augmentation of capacities of existing units, to be sited within the existing premises of the plant at Jajpur, Odisha.

LOCATION

The plant site is located within the Kalinganagar Industrial Complex near Duburi in Jajpur district of Odisha. The study area is surrounded by the geographical grids approximately ranging from 86º01’53.13” to 86º03’42.568” E Longitude and 20º56’23.329” to 20º58’09.819” N Latitude. The project site location is shown in Fig. 3-1.

DETAILS OF ALTERNATE SITES CONSIDERED AND THE BASIS OF SELECTING THE PROPOSED SITE

The increase in capacity would mainly occur by installation of units of higher capacities as well as augmentation of existing units. The area within the premises of the existing land of JSL would be able to house the additional units. Hence, more land would not be acquired. The existing site has also the following adequacies:

i) Availability of adequate land for installation of additional units

ii) Availability of suitable infrastructure in terms of connectivity, availability of water & power

ii) Suitability of the land from topographical and geological considerations.

iv) Location away from forests, national park/sanctuaries, sea coast and ecologically sensitive elements
3 - Project Description (cont’d)

FIG. 3-2 - SITE LOCATION MAP

SIZE OR MAGNITUDE OF OPERATION

The plant after expansion would produce 2.2 MTPA stainless steel slabs along with 1.6 MTPA Cold Rolled Product.

LAYOUT

The plant general layout of the proposed project is shown in Drawing No 11443-97A-000-LTL-001. The layout is complete with the plant units, administrative buildings, water reservoir, storage area, road network and greenbelt.

PROJECT DESCRIPTION WITH PROCESS DETAILS

The plant would be designed for production of 2.2 MTPA liquid steel, to be cast into slabs for further finishing in Hot Rolling and Cold Rolling facilities of JUSL and JSL.
3 - Project Description (cont’d)

The proposed production of liquid steel and subsequent rolling would be accomplished via Electric Arc Furnace (EAF)-AOD-LF-Slab Caster route.

The facilities for production of 2.2 MTPA stainless steel slabs are shown in Table 3-1.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Unit</th>
<th>Facility</th>
<th>Existing</th>
<th>Proposed</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SMS</td>
<td>2 x 100 t EAF</td>
<td>2 x 150 t EAF (upgradation of existing 100 t converters) 2x 6 t + 1x 200 Kg Testing Induction Furnace 1x30 t Holding Induction Furnace</td>
<td>2 x 150 t EAF 2x 6 t + 1x 200 kg Testing Induction Furnace* 1x30 t Holding Induction Furnace*</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Secondary Refining</td>
<td>1 x 120 t LF 1 x 120 t AOD</td>
<td>1 x 150 t LF (upgradation of existing 120 t) 1 x 150 t LF (New) 1 x 150 t AOD (upgradation of existing 120 t) 1 x 150 t AOD (New)</td>
<td>2 x 150 t LF 2 x 150 t AOD</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Caster Shop</td>
<td>1 x 1 - Strand slab caster</td>
<td>1 x 1 – Strand slab caster (New)</td>
<td>2 x 1 - Strand slab caster</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CRM</td>
<td>HAPL – 1 x 0.8 MTPA CAPL – 1 x 0.45 MTPA Finishing Lines (Slitting, Cut to length, Skin pass mill etc.)</td>
<td>HAPL – 1 x 0.8 MTPA (New) CAPL – 1 x 0.45 MTPA (New) Finishing Lines (Slitting, Cut to length, Skin pass mill etc.) (New)</td>
<td>HAPL – 2 x 0.8 MTPA CAPL – 2 x 0.45 MTPA Finishing Lines (Slitting, Cut to length, Skin pass mill etc.) (New)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Air Separation Plant</td>
<td>1 x 425 TPD</td>
<td>1 x 425 TPD (New) (BOO Basis)</td>
<td>2 x 425 TPD (BOO Basis)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Ferro Alloy Plant</td>
<td>0.25 MTPA (2 x 60 MVA + 3 X 27.6 MVA); 13 MW WHRB; 50 TPH AFBC Boiler; Briquette Plant- 126 TPH</td>
<td>Capacity expansion of Briquette Plant up to 180TPH (including existing)</td>
<td>0.25 MTPA(2 x 60 MVA + 3 X 27.6 MVA); 13 MW WHRB with 50 TPH AFBC Boiler; Briquette Plant - 180TPH</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Lime/Dolo Calcining Plant</td>
<td>-</td>
<td>1x450 TPD+ 1x600 TPD (Lime &amp; Dolo) + 200 TPD Hydrated Lime Plant (New) (BOO Basis)</td>
<td>1x450 TPD+ 1x600 TPD (Lime &amp; Dolo) + 200 TPD Hydrated Lime Plant (New) (BOO Basis)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Metal recovery Plant</td>
<td>-</td>
<td>1x 50 TPH 1x80 TPH (BOO Basis)</td>
<td>1x 50 TPH 1x80 TPH (BOO Basis)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>CRMHS</td>
<td>Installed – Matching the production facilities</td>
<td>Matching the production facilities (New)</td>
<td>Matching the production facilities</td>
<td></td>
</tr>
</tbody>
</table>

*For testing and R&D purposes only
3 - Project Description (cont’d)

The production facilities would be adequately supported by necessary auxiliary facilities such as raw materials unloading and storage, proportioning of raw materials, electric power receiving and distribution stations, various utility facilities, water treatment and distribution system, etc.

The preliminary process flow sheet is presented in Drg No. 11443-97A-000-ENV-0801. The following write-up lays down details of the various process units:

**Steel Making**

JSL would install facilities to produce 2.2 MTPA Stainless Steel from the Steel-melt shop.

The facilities after the expansion are shown in the table below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Major Technological units</th>
<th>Capacity after expansion to 2.2 MTPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EAF Converter</td>
<td>2 X 150 ton</td>
</tr>
<tr>
<td>2</td>
<td>AOD</td>
<td>2 x 150 ton</td>
</tr>
<tr>
<td>3</td>
<td>LF</td>
<td>2 x 150 ton</td>
</tr>
<tr>
<td>4</td>
<td>Slab Caster</td>
<td>2 x 1 strand</td>
</tr>
</tbody>
</table>

SMS would be complete with the following facilities:

i) Secondary Emission Control System

ii) Pollution Control Equipment

iii) Associated auxiliaries such as HVAC, Fire fighting facilities, Plant Instrumentation / Automation etc.

Required quantity of steel scrap shall be sourced from outside as well as recycling of in-plant generated scrap.
3 - Project Description (cont’d)

**Lime/Dolo Calcining Plant**

2 Nos. of Calcining Plants with configurations of 1x450 TPD and 1x600 TPD along with 1x200 TPD Hydrated Lime Plant would be installed for the expansion project.

**RAW MATERIALS**

**Sources of Raw Materials**

The probable sources of major raw materials (indigenous/imported) for meeting the production requirements are as follows.

<table>
<thead>
<tr>
<th>Major Raw Materials</th>
<th>Mode of transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel Scrap</td>
<td>Sea/Rail/Road</td>
</tr>
<tr>
<td>Other additives</td>
<td>Sea/Rail/Road</td>
</tr>
<tr>
<td>Thermal Coal</td>
<td>Sea/Rail/Road</td>
</tr>
<tr>
<td>Limestone</td>
<td>Sea/Rail/Road</td>
</tr>
<tr>
<td>Dolomite</td>
<td>Sea/Rail/Road</td>
</tr>
<tr>
<td>Ferro Chrome</td>
<td>Rail/Road</td>
</tr>
</tbody>
</table>

The estimated annual requirements of major raw materials are presented below.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Major Raw materials</th>
<th>Estimated Quantity, tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scrap</td>
<td>1,490,340</td>
</tr>
<tr>
<td>2</td>
<td>Ferro Chrome</td>
<td>702,100</td>
</tr>
<tr>
<td>3</td>
<td>Limestone</td>
<td>524,400</td>
</tr>
<tr>
<td>4</td>
<td>Dolomite</td>
<td>315,000</td>
</tr>
<tr>
<td>5</td>
<td>Other Ferro Alloys</td>
<td>133,120</td>
</tr>
<tr>
<td>6</td>
<td>Other additives</td>
<td>68,100</td>
</tr>
</tbody>
</table>

**PLANT WATER SYSTEM**

In order to conserve water to the maximum possible extent, independent re-circulating systems with cooling towers, pump houses and treatment units, wherever required, have been proposed for the
units envisaged for this expansion project. Make-up water of desired quality will be supplied to each individual re-circulating circuit. In contaminated circuits like EAF and AOD slag quenching etc. make-up water will be fed from blow-down of non-contaminated circuit or high TDS effluent discharged from ETP to conserve water consumption.

The plant water system comprises of industrial quality, make-up water system, soft water system, re-circulating water systems, drinking water system, water based fire-fighting system, treated waste water and effluent water system.

**RESOURCE OPTIMIZATION/RECYCLE & REUSE ENVISAGED IN THE PROJECT**

One of the most important resources is energy and it is proposed to utilise the off gases from the Plant to the extent feasible, for generation of power, thus optimising the utilisation of energy for the Project. In addition, adopting a compact layout for the Plant would enable to optimise the utilisation of land, which is another critical resource. By utilising the fines and scrap generated during the process within the plant for the production process, usage of raw materials is optimised. Water consumption would also be optimised by treatment of water to the extent possible and recycle of treated water as make-up in the network.

**AVAILABILITY OF WATER AND POWER**

**Water**

It is estimated that the total make-up water requirement for the combined expansion of JSL & JUSL would be around 1170 cum/hr, which is within the water allocated (33.449 cusec ~ 3409.8 cu m/hr) to JSL by Water Resources Department, Odisha. The source of water for the existing steel plant is river Brahmani from where raw water is pumped and stored in a raw water storage tank.
3 - Project Description (cont’d)

**Power**

The estimated power requirements of various plant units including utilities and auxiliary facilities for the Plant is indicated below:

\[
\text{Annual energy consumption, kWh} \times 10^6 \quad \ldots \quad 965
\]

At present, Jindal Stainless Limited (JSL) receives power at 220 kV over two 220 kV overhead transmission line feeders from the State Grid at the Main Receiving and Step down Substation (MRSS) of their plant. The present contract demand with State Grid is 55.55 MVA at 0.9 power factor i.e. 50 MW. At present, power received at 220 kV MRSS under JSL is supplied to Jindal Coke Limited (JCL) and Jindal United Steel Limited (JUSL) on chargeable basis apart from catering the power requirement of various plant units under JSL. The same philosophy of power distribution will also be followed for proposed expansion. The power requirement of the proposed expansion would be catered by 2 X 125 MW coal based Captive Power Plant.

Based on the above, after load balancing at 220 kV level at MRSS the balance power would be sourced from State Power Grid.

**WASTE GENERATION AND MANAGEMENT**

**Waste Water Generation and Management**

Waste water, blow down water, effluent water generated from the different units of the plant will be taken to an effluent treatment plant. Water for firefighting system, floor washing, toilet flushing, dust suppression and horticulture shall be provided from effluent treatment plant after treatment. Rest effluent water will be treated to the desired extent in suitable treatment facilities and recycled back to the process as make-up, to attain “zero” effluent discharge, facilitating adequate re-use of water in the respective re-circulating systems and economizing on the make-up water requirement. Reject water from CETP shall be used in
slag quenching/cooling in EAF & AOD slag. Sewage generated from toilet blocks etc shall be collected by means of suitable sewer system for treatment in package type Sewage Treatment Plant (STP).

**Solid Waste Management**

The estimated generation of major solid wastes is tabulated below:

<table>
<thead>
<tr>
<th>Solid wastes</th>
<th>Expected generation, TPA</th>
<th>Management Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel making Slag</td>
<td>642,500</td>
<td>Used for construction and backfilling</td>
</tr>
</tbody>
</table>

Besides the above, there would be other solid wastes like Mill Scale, clarifier sludge, ESP/ Bag Filter dust, refractory debris etc. generated from the proposed steel plant. CRM ETP Sludge generated from CRM shall be disposed off in a secured landfill site. While some of the wastes can be recycled in the process, others would be disposed off in environmentally friendly manner.

**Air Pollution**

Various process operations would generate particulate dusts, volatile organic carbons (VOCs), oxides of sulphur and nitrogen and carbon dioxide to the environment. The emission would be from the stacks as well as there would be fugitive emission of dusts from open & closed areas.

Fugitive dust emissions generating from the handling and stockpiling of raw material in open stockyards would be controlled by water sprinkling at regular intervals. All closed zone working areas such as raw materials handling zone, conveyor transfer points, dust generation points at screen would be provided with dust extraction (DE) systems/dry fogging (DF) at several emission points to control the fugitive dust emissions. DE system shall consist of suction hood followed by bag filter/ESP, ducts, extraction fans and stack of appropriate height.
3 - Project Description (cont’d)

**SMLP (Secondary Metallurgy and Ladle Preparation)**

The primary emissions of EAF & LF would be collected by fume extraction (FE) devices. Dust laden fumes would be indirectly cooled and cleaned through Bag Filter for separation of particulates and the clean gas would be vented into the atmosphere through a tall stack of adequate height. The secondary emissions would be controlled through canopy hood extraction, which would be integrated with the main system to clean the fugitive emissions during charging and tapping operations. The gas cleaning system would be complete with water cooled duct, fume and gas cooler, bag house, ID fan and stack of appropriate height.

**Caster Area**

The water required for cooling the hot cast slabs would generate hot fumes comprising mainly water vapour, hot waste water and suspended particulates which would be treated in Wastewater treatment Plant. The slab casting area would be provided with adequate ventilation in order to have the water vapour properly dispersed.

**CRM**

Burning of the by-product fuel gases in reheating furnace would give rise to the emissions of particulates, CO₂ and NOx. NOx emissions would be controlled by optimising the excess air supply and proper burner design. In addition, fume extraction (FE) system would be installed. The flue gas, which is fairly clean, would be vented through a stack of adequate height. The acid pickling line of CRM would be provided with a fume extraction (FE) system.

For annealing of pickled cold rolled coils, LPG and HFO would be used as fuel in the annealing and reheating furnaces. The waste produced due to burning of fuel would be vent to the atmosphere through a stack of adequate height.
4 - SITE ANALYSIS

CONNECTIVITY

Road Connectivity

The plant site is connected by a link road from SH-20 between Jajpur Road and Talcher. Daitari-Paradip Expressway, also designated as NH-53 is situated to the west of the plant site at a distance of 10 km. The site is well connected by good road network to Bhubaneswar, Cuttack, Paradeep and other places.

Rail Linkage

The plant site is located south-west of Sukinda Road railway station. Daitari-Jakhapura railway line runs on the eastern periphery of the Kalinganagar Industrial Complex area. The site is about 360 km by rail from Kolkata and 110 km from Bhubaneswar.

Airport

The nearest international airport is at Bhubaneswar, about 110 km from site.

Sea Port

Paradeep port and Dhamra Port are about 120 km and 140 km respectively from the plant site.

LAND FORM, LAND USE AND LAND OWNERSHIP

The proposed expansion would take place within the existing plant premises. The existing site is located within the Kalinganagar Industrial Complex (KNIC) in Jajpur district of Odisha and is owned by JSL, JUSL & JCL. Other industries such as NINL, Visa Steel, Tata Steel, Mid East Integrated Steel Ltd etc. are also located within KNIC, in the vicinity.
The present core zone land use is basically built-up area for industrial purpose with greenbelt, water reservoir and solid waste processing & storage area.

**TOPOGRAPHY**

The topography of the study area is generally flat with small hillocks scattered in the study area. The average elevation of the study area is about 51 m above msl.

The topographic features of the study area may be seen from Survey of India Topo Sheet (OSM) Nos. F45 T13, F45 O4, F45 N16 and F45 U1 as extracted in Fig 4-1 on the next page.

**EXISTING LAND USE**

The existing land use of the area around the plant site consists of forest, waste lands, as presented in the following pie chart.
SOIL

The soil cover of the plant area is mostly of sandy loam in nature, reddish in colour with grey soil in some places. The soil is reported to be slightly basic in nature. The hydraulic conductivity of the soil is high due to higher percentage of sand in the soil.
CLIMATIC CONDITIONS

The regional climate is humid tropical. The day time temperature during April-May exceeds 44°C with humidity 69%. The humidity level rises to a level above 80% in the months of July-August. The winter season brings down the temperature as low as 8.5°C with humidity levels around 60%. The annual average rainfall is 1530 mm. Wind flow is generally distributed and wind speed ranges from 8.5 to 20.3 kmph.

SOCIAL INFRASTRUCTURE AVAILABLE

i) The project area falls under ‘Kalinganagar Industrial Complex’. With the development of several large and medium scale industries, the study area has witnessed speedy development of infrastructure with regard to road linkages, black top roads, communication facilities, trade and commerce. The State Highway (SH-2) connects Jajpur and Talcher and the Expressway that runs from Daitari and Paradeep Port are in the study area.

ii) The General Hospital in Jajpur Town is the main health care centre in the study area, equipped with modern facilities. There are few villages having Primary Health Centres as well.

iii) Socio-economic infrastructure facilities like that of schools (both primary & secondary), parks, banks, post offices and shopping centres are available in the study area.

iv) With regard to education, the district of Jajpur is characterized by several educational and professional institutes namely B.B. High School, Dasarathpur High School, N.C.College, V.N College, N.C College, Biraja Women’s College, Biraja Law College, B.S.College, Sukinda College and A.P.College etc.
PLANNING CONCEPT

The project would be sited in Jajpur district, Odisha. JSL already have an existing plant producing 0.8 MTPA stainless steel and the proposed expansion project would be carried out in the existing premises of JSL.

The major industries in the study area are Neelachal Ispat Nigam Ltd.(NINL), Tata Steel, Mid East Integrated Steel Ltd., Visa Industries Ltd., etc.

POPULATION PROJECTION

The study area of the proposed expansion falls in the district of Jajpur, Odisha. The total population of the district as per 2001 & 2011 Census data was 16,24,341 and 18,27,192 respectively. The decadal growth was around 12.49 %. The population projection of the study area for the year 2017 is estimated to be around 19,64,122.

LAND USE PLANNING

The land area presently in possession of JSL is adequate for the expansion project. The following units would be located inside the plant boundary:

i) Raw material yard
ii) SMS (Steel Melt Shop) with Casters
iii) Cold Rolling Mill
iv) Oxygen Plant
v) Lime/Dolo Calcining Plant
vi) Metal Recovery Plant
vii) Water Facilities
viii) Power Distribution System
ix) Water reservoir
The total greenbelt, comprising of about 33% of total plant area would be reserved in the layout. The layout would also house canteen, administrative buildings, workshop, railway tracks, stores, in-plant roads, etc.

**ASSESSMENT OF INFRASTRUCTURE AVAILABILITY**

Required infrastructure for the plant like rail connectivity, Power & Water, road are analysed and found to be meeting the plant requirement.
6 - PROPOSED INFRASTRUCTURE

INDUSTRIAL AREA

The total plant area of JSL is about 786 acre, within the boundary of which the proposed expansion project would take place. The process units, water reservoir, solid waste processing & storage area for the existing facilities as well as the proposed would be housed within this area.

GREENBELT

It is obligatory to develop dense greenbelt area in proposed project plant as per the Regulations. Green belt is proposed to develop in approx 33% of the total area. This would not only prevent the fugitive dust emissions but also improve the peripheral appearance of the plant from aesthetics point of view. Unpaved areas, if any, within the plant boundary would be provided with grass/tree cover.

Following are the proposed species of trees which may be planned to be planted as greenbelt:

i) Sal
ii) Asan
iii) Mahua
iv) Palash
v) Bamboo
vi) Jamun
vii) Amaltas
viii) Bahera
PROPOSED SOCIAL INFRASTRUCTURE

The expansion project entails provision of the following facilities in the Study Area:

i) Supply of potable water in the surrounding villages

ii) Support and augmentation of existing sanitation and primary healthcare facilities amongst the surrounding communities

iii) Development of linkage roads establishing better connectivity with remote villages

iv) Promotion of vocational skills and employability enhancement training programmes emphasizing on tribal women and youth groups

v) Awareness and promotion for use of renewable energy

CONNECTIVITY

The site is bounded by the Daitari-Paradip expressway, also designated as NH-5A, on the west and SH-20 on the northern side which connects the plant site to Jajpur Road. The expressway is connected to NH-5/16 at Chandikhol. The site is also well connected by roads, including National highways, to Bhubaneswar/Cuttack and Paradeep Port.

The plant site is located north-west of Jakhapura railway station on Howrah-Chennai main line. Daitari-Jakhapura railway line runs on the eastern periphery of the Kalinganagar Industrial Complex area. The nearest international airport is at Bhubaneswar, about 110 km from site. Paradeep port is about 120 km and Dhamra Port is 140 km from the plant site. Proximity of seaports is one of the distinct advantages for the proposed expansion of the steel plant.
DRINKING WATER MANAGEMENT & SEWAGE SYSTEM

The drinking water system would cater to the water requirements of (i) plant personnel for drinking and sanitary purposes, (ii) central and area laboratories, (iii) canteen and (iv) other miscellaneous users in the plant. Necessary treatment facility shall be considered to generate potable grade water from make-up water.

The faecal sewerage network of the plant would receive effluent from the administrative building complex, canteens, and toilets of various shops, office buildings, laboratories, etc. located in different areas of the plant. The sewage water received from the above areas would be fed to a sewage treatment plant.

SOLID WASTE MANAGEMENT

There would be numerous solid by-products like steelmaking slags, mill scales, mill sludge, caster and mill scrap, refractory debris, flue dusts etc. generated from the proposed steel plant. The iron scrap generated from the caster lines would be recycled to EAF. The steelmaking slag from EAF, AOD and LF would be used for construction and backfilling purposes. Other solid wastes will be disposed off in environment friendly manner.

POWER REQUIREMENT & SUPPLY/SOURCE

The estimated power requirements of various plant units including utilities and auxiliary facilities for the project are indicated below:

Annual energy consumption for steel plant $10^6$ kWh .. 965
The sources of power for the steel plant as envisaged are as follows:

i) State Grid power supply system at 400 kV.

ii) Captive power Plant (2x125 MW coal based CPP)

The power would be received at 400 kV from State Grid and the same would be stepped down to 220 kV at Bulk Power Receiving Station (BPRS).
7 - REHABILITATION & RESETTLEMENT

The proposed expansion project does not require additional land and would be housed within the available plant area. Hence, there would not be displacement of any human settlement. Hence there are no issues relating to rehabilitation and resettlement.
8 - IMPLEMENTATION SCHEDULE & COST ESTIMATE

IMPLEMENTATION SCHEDULE
The preliminary overall implementation schedule for 2.2 MTPA stainless steel productions with commissioning of various plant facilities of the project is shown in the form of a bar chart in Fig.8-1 which is enclosed with the Report.

It is envisaged that the project would be completed within a period of 36 months from “Go-Ahead date”. It is considered that construction work at site for various plant facilities of the project would commence after completion of major engineering works.

The schedule has been developed based on the estimated capacity of various plant facilities and excluded the plant facilities which were commissioned in Phase-I of the project.

CAPITAL COST ESTIMATE
The order-of-magnitude capital cost comprising as erected mechanical and electrical equipment including related civil and structural steelwork and cost towards design, engineering and consultancy and administration during construction is presented in this section. Provision has also been made for contingency for arriving at the capital cost. The order-of-magnitude cost of the plant would be about Rs 1,444 Crore.

The estimate is based on information available with CONSULTING ENGINEERS for similar facilities. Applicable taxes and duties have been considered in all of the estimated costs. The capital cost estimate may undergo changes based on various location aspects at the site, finalized plant configuration and plant layout.
The costs towards Land, Infrastructure facilities, margin money for working capital, preliminary and pre-operative expenses and interest during construction have not been considered in the above capital cost.
9 - ANALYSIS OF PROPOSAL

FINANCIAL BENEFITS OF THE PROJECT

The financial benefits accrued from the project would not only profit the owners but also strengthen the economy of the state due to earning from taxes and duties from the Plant.

SOCIAL BENEFITS

The Project Proponent with regard to its Corporate Social Responsibility (CSR) towards the community has already undertaken extensive range of initiatives in the sphere of (i) Health (ii) Education & Vocational Skills (iii) Women Empowerment (iv) Community Infrastructure Development (v) Environment (vi) Sports & Youth Development (vii) Swachh Bharat Abhiyan

The proposed expansion project with increased investment would lead to augmentation of the above mentioned initiatives (with special emphasis on tribal groups namely Munda, Shabar, Kolha, Juang) in the Project Influence Area and beyond.

Additionally the proposed expansion project may promote:

i) Improvement in the socio-economic status of the region through generation of direct and indirect employment opportunities

ii) Development of ancillary SME industries, trade & commercial establishments and local entrepreneurship
JINDAL STAINLESS LIMITED
0.8 MTPA to 2.2 MTPA Stainless Steel
Pre-Feasibility Report

FIG. 8-1 - IMPLEMENTATION SCHEDULE
1. ALL QUANTITIES ARE IN TONS PER YEAR ON NET AND DRY BASIS, UNLESS OTHERWISE SPECIFIED.

CAPACITY OF EXISTING FACILITIES
CAPACITY OF PROPOSED FACILITIES

NOTES:
1. ALL QUANTITIES ARE IN TONS PER YEAR ON NET AND DRY BASIS, UNLESS OTHERWISE SPECIFIED.