RATIONALE FOR REVAMPING AND UPGRADECATION WORK TAKEN UP AT RINL/VSP

Integrated steel plants require uninterrupted and continuous supply of Hot metal and liquid steel for smooth functioning of the plant. For this, it is necessary that the related furnaces (that operate at about 1500 °C, 24 hrs a day) function uninterrupted with utmost safety. It is also important that in order to sustain productivity levels, reduce energy consumption, meet latest environmental norms and above all operate safely-it is desirable that an Integrated Steel Plant modernize and upgrade its existing facilities, over a certain period of time.

With intentions that Rashtriya Ispat Nigam Limited, Visakhapatnam Steel Plant (RINL-VSP) – should carry out its operations safely and at the same time, produce steel on par with global standards in productivity, environmental norms and energy levels, RINL-VSP took up the onerous task of modernisation of its existing facilities along with expansion of its production capacity to 6.3 MTPA of liquid steel.

Background
The production of Hot Metal, Liquid steel and saleable steel at RINL-VSP, had attained rated capacities in the year 2001-02 and since then it has consistently operated with full capacity. As a result of consistently operating at high levels of capacity utilization and continuous thrust on production of value added steel- it was deemed necessary that major revamps / capital repairs of the existing critical equipment of the plant should be taken up immediately. This was extremely essential, to ensure paramount safety and in addition would help in meeting the upgraded environmental norms specified vide MoEF notification vide GSR.277(E) dt 31st Mar’2012 for the Indian steel Industry.

Rationale for carrying out upgradation work done leading to enhanced capacities
The furnaces producing hot metal and liquid steel were overdue for revamping and needed to be done urgently. During this planning for revamping, it was decided that RINL-VSP should go for modernizing its facilities along with revamping. This
modernization and revamping drive lead to enhanced capacities- the details of which are brought out below:

**Blast Furnaces**: BF-1 (Godavari) & BF-2 (Krishna) were commissioned in Mar '90 & Mar '92 respectively. Since inception, BF-1 & BF-2 have produced 29.8 Mt & 28.6 Mt till 31.03.09 respectively and have been in continuous production for the last 18 & 16 years respectively. Normal repairs were undertaken earlier to upkeep the health of the equipment. The furnaces are in operation for about 17 years, without any major overhauling of Furnace wall & Hearth. Normally, the Russian BFs are recommended for Category – 1 capital repairs after 18-20 Mt throughputs & after 14 to 16 years of operation. So, both the furnaces were overdue for the major repairs. Moreover, it is experienced that the refractory wear is accelerated at the end of the campaign in hearth, which needed immediate repair for safe functioning.

Hence repair / modernisation of these furnaces were envisaged that would not only improve the health of the furnace but would also ensure cleaner environment and make them more energy efficient. This modernization/ revamping was planned by incorporating modern features eg., pulverised coal injection with adequate amount of oxygen enrichment of air blast and improvement in burden material.

The adoption of improved design cooling system and upgradation of refractory to counter the increased heat load due to the above modern features, has resulted in increase in furnace volume from 3200 cu.m to 3800 cu.m which in turn led to increase in hot metal production. However, no additional construction activity has been undertaken outside the furnace proper.

**Basic Oxygen Furnace (Steel Melt Shop)**: The 3 converters (BOF’s) at RINL-VSP have since inception produced 16.16 Mt, 15.80 Mt & 15.41 Mt respectively of liquid steel till 31.03.09. These BOFs are the only furnaces of this vintage design and working in the world today as was confirmed by their designer M/s Azovmash. Two years ago they recommended total revamp. Number of heats in BOFs at VSP has exceeded 100 thousand in a span of 17 years against accepted service life of 40 to 50 thousand heats in 17 years. Further, Andhra Pradesh Pollution Control Board has advised VSP to take necessary steps for reduction of fugitive emissions and adhere to
latest environmental norms. For this, Dog Houses (enclosures to the converters) along with hoods were required to be installed for proper collection and evacuation of secondary fumes generated during charging & tapping. Hence, the action for revamping of converters has been taken up.

**Sinter Plant**: Sinter Machines 1 and 2 were commissioned in Nov’ 89 and Dec ’91 respectively and have produced 41.66 Mt and 41.63 Mt respectively till 31.03.09. Machines are now due for major repairs to bring back efficiency and earlier reliability, more importantly from environmental point of view. Moreover, break downs in Sinter Machines have resulted in urgent need of repairs. Hence one sinter machine was revamped/ modernised.

**Auxiliaries necessary for enhanced hot metal production**

Due to increase in capacity of hot metal the following facilities were required to be added to the production facilities:

- Turbo Blower-5 was installed as a stand by Blower to Turbo Blower-4 to ensure uninterrupted cold blast to Blast Furnace No.3. This stand by Blower is required to take up the modernisation of the existing Blowers to meet the increased requirement of cold blast in Blast Furnaces. Continuously, only three Blowers will be working feeding cold blast to three Blast Furnaces respectively.

- In order to convert the 1 MTpa additional hot metal being produced after Blast Furnace revamping into steel, semis and finished products, Converter-3 & Caster-4 were installed. All the equipment were designed to meet the latest environmental norms. Once Caster-4 is commissioned and put in operation, it will facilitate revamping and modernisation of existing continuous casting shop.

- Kanithi Balancing Reservoir -2 is being constructed to enhance the water storage capacity. This will keep in meeting the exigencies during sudden non-availability of water and repair/ shut down of KBR-1
Benefits of carrying out revamping/modernisation work:

Due to the revamping/modernisation work carried out at RINL-VSP the following benefits accrued.

1. Continuity in safe operations of the plant
2. Significant reduction in environmental loads of SPM, SO2 and NoX (as detailed in EIA report)
3. Significant reduction in consumption and hence reduced CO2 emissions (as detailed in EIA report)
4. Reduced fugitive emissions during steel making at BOF convertors

Conclusion:

1. Though VSP have got environment clearance for 6.5 MTPA hot metal and 6.3 MTPA liquid steel and 384 MW of power, it is presently manufacturing 4.5 MTPA of hot metal and generating 248.1 MW of power, due to strong driven market forces.
2. Due to the revamping/modernisation work done, it is now operating safely and with lesser impact on environment, due to changes in regulatory watch and APPCB directives.
3. With a primary objective of safety of plant, with expanding to 6.3 MTPA liquid steel production which necessitates the modernization and is also leading to increased production of 1 MTPA liquid steel from 6.3 to 7.3 MTPA.

Keeping in view the i) major environmental benefits and safety aspects that has accrued due to this revamping/modernisation work carried out at RINL-VSP, & ii) RINL-VSP not crossing its production capacities till now, it is requested that MoEF & CC may kindly consider prior EC Application submitted by RINL-VSP for capacity enhancement from 6.3 MTPA to 7.3 MTPA liquid steel.