

## Vikram Ispat Commissions New HYL ZR Module

### ***Successful guarantee testing carried out using 100% lump ore feedstock***

December 19, 2006 – Vikram Ispat a unit of Grasim Industries Ltd., of the Indian Aditya Birla Group, has successfully commissioned a new Energiron direct reduction module at their plant site at Salav, Maharashtra, India. The 550,000 tpy plant uses HYL ZR Process technology without external gas reforming to produce high carbon DRI. HYL and Danieli have joined forces to create the Energiron alliance, the innovative HYL direct reduction technology jointly created by Techint and Danieli, the flexibility of which is illustrated by the Vikram Ispat plants.

Vikram Ispat has been operating a 900,000 tpy HYL plant since 1993 and is the world's only producer of both HBI and DRI from the same reactor, using the process scheme with a natural gas reformer and generating its own electric power requirements. The original design was for HBI production; however Vikram and HYL undertook modifications over the past few years to incorporate a DRI Cooler vessel offline cooling for the production of DRI as well as the production of hot briquetted iron. The domestic market for DRI in India drove the modifications, however the plant continued to produce both product forms for domestic and export markets.

Restrictions in natural gas supply over the past several years had forced the plant to operate at less than 50% capacity, decreasing the overall cost efficiency of the plant. Technical work developed jointly by HYL and VI took advantage of the plant flexibility, increasing production capacity by using Liquid Propane Gas (LPG) in the reformed gas stream and Naphtha in the burners of the natural gas reformer. The new project, commissioned at the end of November, converted the offline cooling reactor to a ZR process direct reduction module with a capacity of 550,000 tpy. By operating this new module at full capacity, optimum efficiency is obtained using the existing available natural gas supply to the plant.

Vikram Ispat expects full gas availability by early 2008 when natural gas will be more readily available in the industrial area of Maharashtra, at which time the original module will be restarted for HBI production. At that time, total operating capacity will reach 1.5 million tons annually, with 900,000 tpy of HBI from the large plant and 550,000 tpy from the new ZR DRI module.

A key point in the startup of the new module is the fact that the iron ore charge consists of 100% lump ore rather than commercial pellet feedstock typically used by most DR plants. The process characteristics allow the efficient use of high percentages of lump ore with excellent results, thus lowering the overall cost of

the metallic charge to the reactor. This DR plant and the HYL plant at Usiba in Brazil are the world's only DR facilities currently operating with 100% lump ore.

The first stage of the Vikram Ispat expansion was completed in a record nine months to take advantage of the strong growth of the Indian economy and iron & steel markets. The successful implementation is backed up by the Energiron alliance of HYL and Danieli created to continue with the innovative HYL direct reduction technology jointly supported by Techint and Danieli.