

# ***Total Ore Processing Integration and Management***

## **10th Quarterly Technical Progress Report 01 October - 31 December 2005**

written by  
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## **Abstract**

This report outlines the technical progress achieved for project DE-FC26-03NT41785 (Total Ore Processing Integration and Management) during the period 01 October through 31 December of 2005.

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## **Executive Summary**

### **Work in Progress**

Graphical analysis of blast patterns according to drill monitor data is continuing.

Multiple linear regression analysis of 16 mine and mill variables (powder factor, two modeled size fractions, liberation index, predicted grind, total crude Fe, Satmagan Fe, sat ratio, DSC, geologic blend, ambient temperature, cobbing hours, feeder plugs, and percent feeder run time-of-mill time) indicates that December variations in plant performance are generally predictable (Figure 1). The outlier on December 28<sup>th</sup> coincides with low cobbing availability and equipment downtime. Mill productivity appeared to be most influenced, as usual, by ore quality as indicated by the liberation index – the higher the liberation index, the lower the throughput.

### **Future Work**

The upcoming quarter will be concerned with wrapping up the work in progress, such as the detailed statistical analyses, and writing a final report.

Hibtac Mine engineers are evaluating neural network software to determine its utility for modeling, and eventually predicting, mill throughput.

### **Dissemination and Outreach**

Mike Orobona of Hibtac Mine is preparing a paper for the Society of Economic Geologists' 2006 Conference, to be held in Keystone, Colorado on 14-16 May 2006. The title of the paper is "Exploring the Data – Adding Value with Non-traditional Geologic Initiatives on Minnesota's Mesabi Range," and the authors are M. J. T. Orobona, L. Gertsch, and J. W. Eloranta.

## Introduction

This tenth quarterly report discusses the activities of the project team during the period 1 October through 31 December 2005.

## Work in Progress

### Minntac Mine

Graphical analysis of blast patterns according to drill monitor data is continuing.

### Hibtac Mine

Multiple linear regression analysis of 16 mine and mill variables (powder factor, two modeled size fractions, liberation index, predicted grind, total crude Fe, Satmagan Fe, sat ratio, DSC, geologic blend, ambient temperature, cobbing hours, feeder plugs, and percent feeder run time-of-mill time) indicates that December variations in plant performance are generally predictable (Figure 1). The outlier on December 28<sup>th</sup> coincides with low cobbing availability and equipment downtime. Mill productivity appeared to be most influenced, as usual, by ore quality as indicated by the liberation index – the higher the liberation index, the lower the throughput.

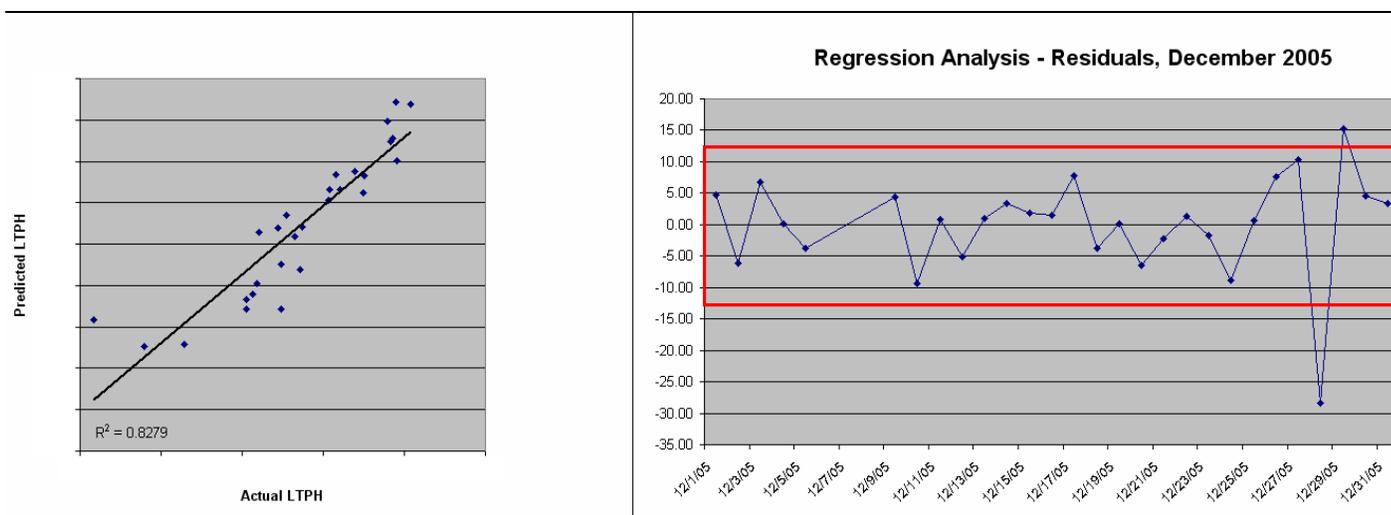


Figure 1. Straightforward linear regression of 16 variables at Hibtac successfully explains mill throughput trends for December.

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