Note on the Evaluation of Magnetite Deposits - DTR percentage and DTC grade are the keys

OLARY MAGNETITE PTY LTD - an example - Compared

It has now been established that the mining DTR percent (DTR = Davis Tube Recovery) at olary orebody NE 12 will be 21%. At adjoining Olary Creek the average DTR% will be 28%. The Davis Tube Concentrate (DTC) grade is 70% in both cases. The DTR percent has very significant positive implications for the project as summarised below which compares some of the impacts of mining with a 28% DTR or 21% DTR versus a 14% DTR.

Production of 1 million tonne of concentrate from ore of DTR 28% or 21% versus DTR 14%

- At 28% 3.6 and at 21% 4.76 million tonne ore are mined and processed V's 7.2 million tonne (50% more)
- If stripping ratio is 0.5 to 1, total rock mined is 5.4 or 7.2 V's 10.8 million tonne (+3.6 million tonne)
- If stripping ratio is 1.0 to 1, total rock mines is 7.2 or 9.52 V's 14.4
- Higher DTR = Lower power & water usage = Lower Cost Operations
- Higher DTR = Lower total volumed mined = Lower Cost Operations
- Olary NE 12 orebody - DTR is 21.2%. Olary Creek ROM DTR will be 28%

Obviously, the higher the DTR percent at which we can mine, the better are competitive costs.

A description of the most important features of DTR and DTC follow.

In the magnetite mining and concentrate production business, the universally accepted measure of the percentages of magnetite in the ore and the grade of that magnetite when recovered as a concentrate is determined by the Davis Tube Recovery (DTR) device. This device gives a good measure of the percentage of magnetite that will be recovered from the rock in an industrial magnetic separation plant. The DTR device actually does this by separating the magnetite (the DTC - Davis Tube Concentrate) from the rock mass sample. Subsequently the chemical composition of the paper the percentage of magnetite that can be recovered from the rock mass and also allows for the determination of the chemical composition of the recovered DTC magnetite concentrate.

Inexperienced geologists do not always understand how to assess magnetite as an iron mineral commodity. They sometimes do not follow the universally accepted DTR procedure in respect of their exploration drilling. Initially they do only chemical analysis for total iron. Later in the program they gain knowledge and begin using the standard DTR approach. In an attempt to "create" results after the event for the large proportion of samples for which they have no DTR and DTC results, they perform measurements of magnetic susceptibility on these samples and come up with a confection which is sometimes called e-DTR. They correlate the magnetism measurements (e-DTR) with the DTR on samples for which they have DTR. For reverse circulation drilling samples, the correlation is always very poor. For diamond drill core samples it is not as bad. However, with this e-DTR confection we only get a rough estimate of the quantity of magnetite in the rock. As no magnetite concentrate (DTC) is produced, no measure or estimate can be made of the chemical composition of the magnetite in the rock and hence the result is at best a guesstimate only of the likely magnetite percentage in the sample. No analysis of the concentrates (no DTC) is possible because there is no concentrate. This e-DTR is not useful under the JORC code for anything beyond inferred resources. In this writer's opinion it most certainly should not be used to declare measured or indicated resource and therefore is useless for any determination of proved

and probable reserves as required for any kind of Feasibility Study. [Note by Gordon Toll BE. (mining)(hon) MSc. (Business) FAusIMM]

It is of fundamental importance to ensure any team evaluating magnetite deposits has a deep and complete understanding of magnetite and how to assess it from an ore resource, reserve and recovery perspective.

Figure 1. Typical Davis Tube Recovery (DTR) Measuring Device