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FROM	Nigel Ricketts	JOB NO.	60161	DATE	28 September, 2010
SUBJECT	Ability of Galmoy Plant to treat 750,000 tpa				

Summary

The Galmoy plant had a nameplate capacity of 650,000 tpa. Meridian would like to know whether the plant could be pushed to 750,000 tpa without major equipment changes.

A preliminary investigation has concluded that the Galmoy plant, reinstalled and operating on the Emmanuel Range deposits of Kapok, Kapok West, Kapok East and Cadjebut Splay is likely to be capable of processing 750,000 tonnes per annum of feed, providing some minor modifications are made to the flotation configuration and a larger lead concentrate thickener and a larger lead concentrate filter are installed.

However, metallurgical test work needs to be conducted on the various deposits as soon as fresh drill core is available to confirm the ore competency and flotation characteristics. When this is combined with a realistic mine plan, a proper mass balance can be done and the layout examined in detailed to determine whether the plant will cope with the various slurry and solution flows that will be generated.

The difficulty in providing a definitive answer is a consequence of several pieces of missing critical information:

- A mine plan including lead and zinc head grades
- Metallurgical test work including comminution testing of all components of mineralisation in the mine plan
- The required grind size on all of the deposits within the mine plan

The Galmoy plant had an orebody that was zinc dominant. Hence the zinc concentrate handling equipment is larger than the lead equipment. At the time of writing this memo, the resource estimate suggests that the ore fed to the mill will be lead dominant. The lead and zinc circuits could be potentially swapped over, but without detailed analysis, this is difficult to assess.

The ore characteristics of the Emmanuel Range deposits indicate it appears to be softer than the ore treated at Galmoy. Therefore the comminution circuit will probably be able to cope without major modification. The Galmoy regrind mill will not cope. The limited test work suggests that regrinding of Kapok ore is unlikely to be required so this is not an issue.

Therefore, based on the limited available information, the comminution circuit of the Galmoy plant will probably cope with 750,000 tonnes of ore if the Bond ball mill work index and grind size of the mine blend is similar to historical Kapok ore.

Whether the flotation circuit copes will depend on an as-yet to be released mine plan. It is likely that the lead flotation circuit will require modification to cope with much higher lead throughput than was experienced at Galmoy. Investigations into swapping zinc and lead circuits should be considered. The pyrite flotation circuit provides extra flotation cells should they be needed and will probably be sufficient. However, consideration will need to be given to increasing the size of one of the concentrate thickeners and one of the concentrate filters to cope with 750,000 tpa of lead-dominated feed.

Galmoy plant capacity

The capacity of the Galmoy plant and the equipment installed is detailed in the site visit report by Marius Phillips 60161-00000-21-002-001 dated October 2009. The capacity is stated as 650,000 t/y at a nominal throughput rate of 84 t/h. The concentrator design head grade is summarised in Table 1.

	Zinc (%)		Lead (%)	
	Nominal	Maximum	Nominal	Maximum
Design Head Grade	11.3	N/A	1.1	N/A
Actual Head Grade	12.5	18.0	3.5	5.0

Note the high ratio of zinc to lead. In order to increase to 750,000 tpa, the feed rate would have to increase to 97 t/h.

Comminution

In addition to the report by Marius Phillips, Jonathan Campbell conducted a +/- 30% examination of the comminution circuit of the Galmoy plant in AMEC Minproc report 60161-00000-21-002-002. This report showed that with an assumption of a BWi of 10.8, the SAG mill would draw 822 kW of the installed power of 1000kW when processing 111 t/h. Hence the SAG mill would appear to be adequately sized.

For the ball mill, a feed rate of 111 t/h would draw 734kW of an installed power of 760kW. Hence processing 97 t/h should be within the capacity of the ball mill, assuming grind sizes were the same as used at Galmoy. Indications are that the grind size used at Galmoy could be finer than that required at Kapok and Kapok West.

Flotation

Historical data is available on flotation performance of Kapok ore. Recent bench scale work on Kapok West material showed that it had similar flotation characteristics to Kapok material.

The real issue in processing 750,000 tpa of ore through the Galmoy plant will be total lead and zinc units passing through the concentrator and the concentrate handling thickeners and filters. Galmoy would appear to have much higher zinc grades than any of the deposits in the Emmanuel Range area.

At the time of writing this report, a mine plan for the Emmanuel Range project was still being developed. Therefore it is difficult to determine whether the lead and zinc units passing through the plant will be able to be handled by the equipment. Of particular concern is the likely initial processing of Cadjebut Splay mineralisation as the first material treated.

In order to cope with this, the current plan calls for an examination of the possibility of switching the lead and zinc circuits over when treating Cadjebut Splay material. This will mean directing the high tonnage stream to the largest concentrate thickener and the largest concentrate filter. The layout requirements for switching over will need careful consideration and may result in layout of the plant in a manner that would differ from the way the Galmoy plant was laid out.

Switching of the float configuration could have implications in froth transport. Typically lead froths are heavier and stickier than zinc froths. Hence the froth launders will need to be designed to cope with both duties. In addition, reagent addition points will need to be duplicated to be able to go to either flotation circuit.

Once mining gets going into multiple ore bodies at the same time, there may be a need to switch back. At the higher throughput rates, the extra three 20 cubic metre rougher cells from the pyrite circuit are likely to be required, probably to assist in the lead roughing circuit.

Once production increases and the ore gets closer to an equal amount of lead and zinc, it is likely that the smaller of the two concentrate filters will be undersized and a larger filter is likely to be required. In a similar manner, the smaller of the two concentrate thickeners is also likely to be undersized. It would be prudent to examine upgrading the smaller lead thickener and lead filter at the time of re-installation.

Tailings pipeline

Care needs to be taken in designing the tailings pipeline for turndown capacity. If the pipeline is designed for 750,000 tpa, it will have the potential to sand up when using lower slurry velocities. In order to cope with a potential slow ramp up of production, water addition into the tailings line needs to be added to keep volumetric flow within the design band. As there appears to be an excess of water at the plant site, this should not prove to be a problem.