

DREDGING REPORT

SCOTIA MINE

INTRODUCTION

This report looks at the potential use of cutter suction dredging for the removal of overburden and the dredging of the ore bearing wash material.

A site visit was conducted on the afternoon of the 9th November and the morning of the 10th November 2010.

The ore body had been partially uncovered and access to the overburden and wash was available. At the time of the site inspection, an excavator was not available to view the material being removed from its Insitu position, therefore elements of this assessment is based on observations of others who have previous experience on the site.

This report looks at a 2 dredge option for the mining and stripping operations, as the interface of material types and the site generally is undulating in nature, an average 4:1 overburden to mining ratio has been used. The mining rate of 200 TPH has been used for dredging the wash, and 800TPH has been used for overburden removal.

From the site visit it can be concluded that both the overburden and wash material are “dredgeable” with the use of cutter suction dredges, this report includes an estimate of costs using a dredging method of material handling.

This report does not cover other costs or any associated mining issues associated with using cutter suction dredges.

The report is viewed with the use of dredges that Neumann Contractors have available in their current fleet. Comments regarding throughput, wear rates, dredgeability etc. have been considered with this in mind.

OVERBURDEN REMOVAL

The overburden is a quartz and clay matrix with layers of clay dispersed throughout. The quartz is angular and sharp and is bound together by the clay material to form a cohesive material. During the site visit it was noted that the material had been cut down at approx. 5 metre benches and was up to 15 metres deep in places. The overburden was standing at a slope of approx. 1:1.

Due to the nature of the overburden material, it is anticipated that wear rates of cutter teeth, slurry pump parts, slurry pipelines etc. would be high. This has been taken into account.

It is anticipated that the top 2-3 metres of overburden would be removed with conventional earthmoving equipment.

As the overburden to be dredged is a cohesive material and not loose or free flowing, the dredging would be conducted by benching down at 3-4 metre levels to minimise the risks of major face collapses onto the dredge cutter and ladder.

It is anticipated some of the quartz would be liberated from the clay matrix during the dredging process, however it is likely that a portion of the overburden would be discharged from the pipeline in its Insitu form as a bound clay/quartz matrix, particularly if pumping shorter distances. This may cause mounding of the material at the discharge location.

For this review, the following assumptions have been used:

- 450mm cutter suction dredge
- Insitu density of 1.8 tonnes /m³
- Pumping distance of 800 metres
- Static head of 10 metres.
- 800TPH
- Slurry flow rate of 825 Litres/second
- Fuel is included
- Approx. 1400 Kw of power required
- Allowance for a dredge operator has been included

A budget cost for the dredging of overburden material would be approx. \$ 5.35/m³ in cut or \$2.95/tonne

DREDGING WASH MATERIAL

The wash material is a very loose, wet and angular quartz material. A Particle Size Distribution has been completed from a small grab sample taken from site (Appendix A). This PSD has been used to assess wear rates and power requirements for the dredging of the wash. Due to the nature of the wash, this material would also have

high wear rates of cutter teeth, slurry pump parts, slurry pipelines etc. and has been taken into account.

It is anticipated that the dredging would be done with a first pass through the material cutting at or near the interface with the rock floor. A cleanup cut to minimise any cutter spill from the first pass would then be done. This can either be undertaken on each spud rotation (3 metres) or as the anchors require moving forward (approx. 9 metres).

As the material is described as “loose” and “free flowing” and is up to 5 metres in depth, the likelihood of problems from face collapses is very low.

For this review, the following assumptions have been used:

- 250mm cutter suction dredge
- Insitu density of 1.7 tonnes /m³
- Pumping distance of 200 metres to a screening plant to remove oversize.
- Static head of 10 metres.
- 200TPH
- Slurry flow rate of 225 Litres/second
- Fuel is included
- Approx. 295 Kw of power usage
- Allowance for a dredge operator has been included

The budget cost for dredging the wash material would be approx. of \$ 6.70/m³ in cut or \$3.95/tonne

An opportunity to undertake trial dredging on the site is possible should a dredging method be considered further. Should you wish to pursue this option, we would be able to assist.

Regards,

David Neumann
DREDGING MANAGER

APPENDIX A:

Form No. GCR053 Rev. 7 06/09

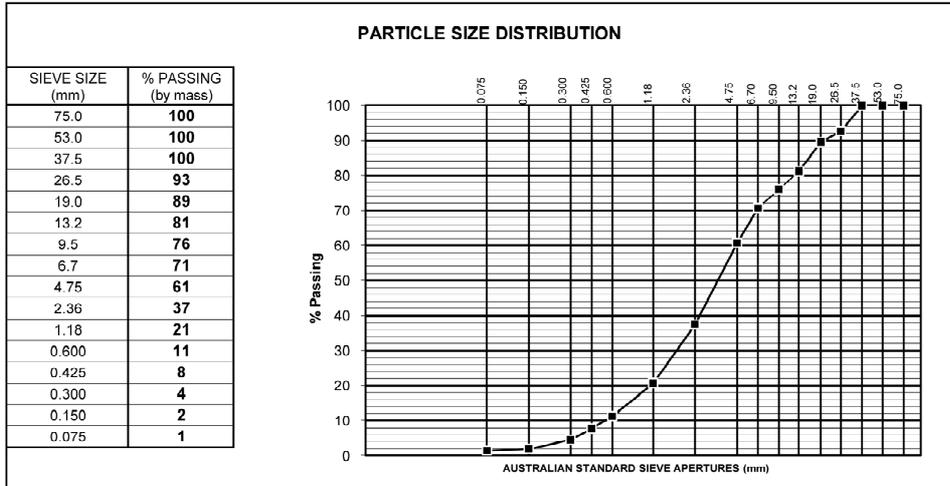


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AGGREGATE PROPERTIES	
SAMPLING PROCEDURES: Sampled by client TEST PROCEDURES: AS1141.3.1-6.95, 11, 12, 15	
CLIENT: NEUMANN CONTRACTORS	JOB No.: GC 2267
PROJECT: SCOTIA TIN MINE (SAMPLE DELIVERED 13/11/09)	REPORT No: 1
	DATE ISSUED: 16/11/09
TEST ITEM: "ORE"	ORDER No.: -
SITE TEST No.: Q 1	LOCATION: WASH STOCKPILE
SAMPLE No.: 79855	
DATE SAMPLED: 11/11/09	
DATE DELIVERED: 13/11/09	SOIL DESCRIPTION: GP SANDY GRAVEL, grey
MATERIAL SOURCE: SCOTIA TIN MINE	
PROPOSED MATERIAL TYPE: -	LEVEL: -

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Approved Signature:
S Thomas