ProMet Engineers

Report

C5397-RP-001 Rev P2

LONERGAN EDWARDS & ASSOCIATES LIMITED

DUE DILIGENCE REPORT

ABM SAVAGE RIVER OPERATION

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EXECUTIVE SUMMARY

ABM (Australian Bulk Minerals) operates a magnetite mine and beneficiation plant at the Savage River site and a pellet plant at Port Latta, both in the North West corner of Tasmania (the Project).

Lonergan Edwards & Associates Limited (Client) has requested ProMet Engineers Pty Ltd (ProMet) prepare a due diligence technical review of the operating and logistics aspects of the Project based on a recent visit to the Project and previous studies ProMet has made for ABM over the last several years. The report has been prepared specifically:

- For use in assessing the value of the ABM assets.
- For use in connection with an assessment of the processing and logistical risks of the Project.
- To include in the risk assessment section, where possible, appropriate mitigating and ameliorating factors.
- To advise on the potential and costs for increasing annual production.

Prior, to this commission ProMet had had the opportunity of acquainting itself with the up-to-date state of the ABM operation by sending a six man team to make site inspections at both the mine site and pellet/ship load-out plants during the period 22nd to 24th April 2008. Three of the team had previous operational experience with the ABM facilities.

The overall impression of the Savage River operations, management and workforce was that they were all of a surprisingly good quality. When members of the ProMet team were in the employment of Savage River there had been a great divide between the two parts of the operation – the two parts being the mining/concentration site at Savage River and the pelletising/load out site at Port Latta. This was obviously now not the case and the benefits of the vastly more integrated method of operation were very apparent.

No red flags/fatal flaws were apparent within the plant operations area but there are some issues that the Client needs to be aware of:

- Mining Plan – at the time of the visit ABM has reached the limits of the accessible ore in their current main mining area which is 250m deep and with wall angles such that the mine area is too small to efficiently continue mining. ABM at that time intended to further develop the mine by extending the area of the mine from the surface level downwards. The availability of new mined ore for the 3-6 months following the visit would have been limited and ABM intended to use stockpiled ore for continued operation. This period of restricted fresh ore supply should be over or nearly over – ProMet, however, has received no up–to–date advice on the success of this mine extension venture.

- Long Term Mining Plan - ABM plans to mine in excess of consumption for a considerable number of years and accumulate about 20Mt of stockpiled ore which will gradually be consumed over the last few years of operation. This plan appears to load costs in the early years with the returns only coming some years later. The physical location of a 20Mt stockpile would seem to be a significant logistics issue on the ABM site and most of the 20Mt would need to be double handled increasing costs. There is a risk that any change in ore properties during this time, particularly, ore hardness may cause mill limitations – see Risk Analysis.

- The pipeline is potentially the most vulnerable part of the production chain and will need special attention, see below.

- Sustaining Capital – during the visit ABM provided ProMet with its capital expenditure plan which seems very comprehensive with a good deal of planning involved. The plan was not reviewed in detail as part of this due diligence exercise. It is believed that some of the more significant Capex items can be eliminated based on future needs or achieved in a more cost effective manner. The optimum approach in each case should be analysed via engineering studies and if such studies are commissioned and acted upon we believe there is minimum risk of any significant increase in the capital budget. The plan includes considerable allowances for maintaining and upgrading the electrical and computer systems, and also for monitoring and repairs for the pipeline.

- The cost to mine ore is relatively high for the remaining mine life – which may be an issue if ore prices fall dramatically. Some risk is therefore associated with the forecast movement in the ore price, which is predicted to reduce from 2011 or so.

Both of ABM's plants have established operations and the company has a good sales record. ABM also has an excellent safety performance and knowledge of how to mine and beneficiate magnetite efficiently. ABM is a competent operator which has demonstrated the ability to cope with serious issues – for example, the recent fire and pipeline failure. The plants were assessed by the ProMet team as being in "good to excellent" condition and well maintained. The previous problems with pellet kiln refractory life appear to be solved by the recent conversion to gas firing. This change has also given lower operating costs. Electrical costs are based on completed hydro schemes – and ostensibly should not be subjected to carbon taxes.

With regard to the electrical systems the site maintenance staff has made a good effort to maintain and refurbish existing electrical switchgear and control systems. This, however, does not guarantee the integrity of this switchgear for future long term operations and increased attention is recommended for equipment monitoring, and refurbishing. Evaluating the suitability of the existing switchgear in light of improving safety standards and increasing system fault levels that may arise due to grid and/or plant upgrades is also important. The overall recommendation is to undertake an engineering study approach on a whole of plant basis.

The pipeline is a critical item for continuing plant operation and ABM pay considerable attention to its well being and maintenance in particular using expertise from outside the company to assist. The ProMet team included one such expert and his report from the visit and an included earlier report by PSI should be essential reading for the on-going operations team.

Some issues to note are:

- Any increase in load on the pipeline may give rise to unknown problems.
- Any reduction in ore grind size because of the different ores to be mined may reduce pipeline carrying capacity.
- Access to the pipeline for maintenance is very limited at present and will remain so.
- Plant production is limited by pipeline capacity – which can not be cheaply increased.
- It is recommended that a rapid response repair team is planned for in the future budget.

A feasibility study was undertaken by the Project's management called the Mine Life Extension Project (MLEP). If the details of the Mine Life Extension plan points to the possibility of a significant change in required duty for the pipeline ProMet would recommend that a new study be commissioned using a pipeline expert.

Financial forecasts for the present production case based on the MLEP data and for the 2.9Mt/y potential up-grade have been reviewed by ProMet. These are known to be based on actual operating cost information and as such there is a sound basis for the generation of such forecasts. The forecasts are consistent with the experience gained by ProMet in the course of developing similar projects.

Currently, ABM is producing around 2.33 Mt/y of pellets at an average grade of 66.7% Fe. ABM has spare pelletising capability and various studies have been undertaken in the past reviewing the possibilities and costs for making use of this spare capacity by increasing the in-plant concentrate production and pipeline capacity. An overview of this possibility is presented within the report. In ProMet's opinion the plant capacity can be readily increased to 2.9Mt/y pellets without major modifications to the pipeline system. The cost of this was assessed as $52M in 2007. This gives a capital outlay of under $100/annual t of pellets compared to a new facility which would be expected to cost between $280-$370/annual t.

Another possibility may exist if alternative concentrate supplies can be delivered to Port Latta to give the same increase in production. In the short term additional import facilities via the jetty would appear feasible. However, this needs to be fully costed given that the shipping costs of the ore would add to the already high ABM production costs.

For the longer term, once the newly exposed ore is depleted, around 2022, ABM believe they can get additional ore by repeating the current mine extension mining plan. This further extension to the life of ABM was not part of the original ProMet scope of work and as such was not specifically addressed during the site visit. ProMet have tried to assist in the assessment of this extra mine life with what knowledge is available and with what limited possibilities there are in predicting costs and operational issues at that time.

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APPENDICES

1. Savage River Concentrator Plant – Dwg No. 32059 Concentrator Flow Sheet
2. Port Latta Pelletising Plant – Dwg No. 32057 Plant Flow Sheet
3. Savage River Pipeline Assessment – Pipeline System Audit Report
4. Team CVs
5. Photographs
6. DPWIE SRRP Schedule (2) and MLEP 2007 – 2022 Capex

1. INTRODUCTION

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Lonergan Edwards & Associates Limited (Client) has requested ProMet Engineers Pty Ltd (ProMet) prepare a due diligence technical review of the operating and logistics aspects of the Project based on a recent visit to the Project and previous studies ProMet has made for ABM over the last several years. The report has been prepared specifically:

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- To include a risk assessment section which would, where possible, identify areas of risk and appropriate mitigating and ameliorating factors.
- To advise on the potential and costs for increasing annual production

Prior, to this commission ProMet had had the opportunity of acquainting itself with the up-to-date state of the ABM operation by sending a six man team to make site inspections at both the mine site and pellet/ship load-out plants during the period 22nd to 24th April 2008. Three of the team had previous operational experience with the ABM facilities.

The overall impression of the Savage River operations, management and workforce was that they were all of a surprisingly good quality. When members of the ProMet team were in the employment of Savage River there had been a great divide between the two parts of the operation. This was obviously now not the case and the benefits to the vastly more integrated method of operation were very apparent.

This report covers operating and maintenance features of the two ABM operational sites and the connecting pipeline and also includes comments on the financial budgets presented by ABM.

A Strengths/Weaknesses/Opportunities/Threats (SWOT) analysis has been prepared and included as Section 7. The main opportunities listed in the SWOT table are further discussed in Section 8.

Currently, ABM is producing around 2.33 Mt/y of pellets at an average grade of 66.7% Fe. ABM has spare pelletising capability and various studies have been undertaken in the past reviewing the possibilities and costs for making use of this spare capacity by increasing the in-plant concentrate production and pipeline capacity. An overview of this possibility is presented within the report.

2. BACKGROUND

The Project's current operation was due to conclude in 2009. This has been driven by the mine plan which saw the conclusion of mining in the existing North Pit last year, while the concentrator and pellet plant continues to operate using stockpiled high and low grade materials.

A feasibility study was undertaken by the Project's management called the Mine Life Extension Project (MLEP). The MLEP has been implemented and envisages the continued mining of the North Pit for an extra 14 years to produce 60.4 Mt of concentrator feed at an average grade of 52.6% DTR (Davis Tube Recovery).

This mining will require a substantial waste movement exercise, including a large pre-strip which must be completed by the end of 2008 to ensure continued ore supply to the concentrator. Additionally, a volume of old waste and clays must be removed.

3. SCOPE OF WORK

3.1 Scope of Work

ProMet scope was agreed as:

- Presentation of its findings in a concise report, to include:
  - An executive summary
  - A risk assessment section which will, where possible, identify areas of risk and appropriate mitigating and ameliorating factors

The Report was to specifically target a review of any critical and relevant process and logistical issues in relation to the Project and to focus on the identification of key issues and risks. The scope of work would involve a review of the following:

Process

- The condition of the concentrator and level of maintenance being undertaken.
- The condition of the pellet plant and level of maintenance being undertaken.
- Performance and viability of the proposed and current treatment process including current production, forecast production and adequacy of test work and process engineering for the MLEP.
- The level of engineering that has been carried out to prepare the plant expansion design.
- Infrastructure, including provision of water, and power.
- Capital cost estimates for the MLEP.
- Operating cost estimates and procedures for the MLEP.
- The suitability of the MLEP construction engineering contracts (including sufficiency of liquidated damages for schedule and performance delays, cost overruns, and warranties).

Logistics

- The materials handling arrangements, particularly with respect to transportation and export of the pellets, concentrate and chips.
- The capacity and condition of the slurry pipeline and associated infrastructure between the mine concentrator and the pellet plant.

Overall

- The ability of the logistics and processing operations of the Project to meet forecast throughput rates, recoveries, concentrate and pellet qualities and sales volume targets (assuming ore production from the mining operation is on target).

3.2 Initial Work

Prior to the visit the ProMet team was able to access the ABM On-line Data Room to acquaint themselves with the fundamentals of the MLEP and other relevant information made available by ABM. In addition, a list of questions raised by the data review was prepared for the consideration of ABM. The advice on required additional data and the list of questions was made available in time for the ProMet site visit.

The Due Diligence continued with a site visit to Tasmania during April. The team visited both the operations at the mine site/concentrator plant, and the operations at the pellet plant/material handling export facility. Discussions of half a day each were held at the two locations.

4. VISIT NOTES

4.1 General

To acquaint themselves with the up-to-date state of the ABM operation ProMet sent a six man team to make site inspections at both the mine site and pellet/ship load-out plants. Three of the team had previous operational experience with the ABM facilities.

ProMet Team

Derek Macauley	Study Leader
Brian Povey	Metallurgical and Process Consultant
Ben Ziegelaar	Electrical Engineer
Scott Davies	Process Engineer
Frank Salt	Pipeline Consultant
Bob Fergusson	Maintenance Engineer

Visit Dates

Tuesday	22 April 2008	Inspection of Port Latta operations
Wednesday	23 April 2008	Inspection of Savage River operations
Thursday	24 April 2008	Presentation by ABM planners of Savage River financial forecast

This section of the report covers notes and flow sheets taken during the visits. In addition a selection of the photographs taken during the visits is included as Appendix 5.

Reports prepared after the visits are include as Section 5**.**

4.2 ABM Presentation Bullet Points for Due Diligence Team given at Port Latta Office

- Safety.
- "ABM CARES" Safety Management System.
- Best safety record achieved over the last 5 years since the start up in 1997.
- LTIFR reduced from 60 to 0 in 48 months and ran at 0 for 21 months. Currently 7.38.
- Achieved 245 days LTI free this year for the entire site.
- Operations team is currently running at 2547 days LTI free.
- Maintenance team reached 1086 days before an LTI (currently 383).
- Contractors on site reached 1865 days before an LTI (currently 245).
- DNV International Safety rating system (ISRS) of 7 on the Port Latta site was level 4, five years ago.

- Systems that are being used daily to achieve this improvement are as follows:
  - "ABM CARES" manual for safety management plan.
  - Pre-shift tool box talks.
  - Stretching exercises program at all pre-shift meetings.
  - Active use of the Drug and Alcohol Policy based on zero tolerance. This policy has been running on this project for nearly ten years.
  - Written job safety analysis on all jobs which do not have a standard SWP (Safe Work Procedure).
  - Full use of Work Permits; including confined space, hot work, working at height, excavating, radiation, asbestos related work, diving permit and work over water.
  - Full use of a detailed isolation procedure for both mechanical and electrical isolation including use of personal safety locks for all personnel.
  - Identifying high-risk activities and the use of risk assessment teams to review these difficult tasks.
  - Ensuring that all team members understand Duty of Care and Refusal to Work provisions in the State Workplace Safety Legislation.
  - Ensuring that all near misses and loss control incidents are considered to be the free lessons that must be taken advantage of in determining corrective action.
  - Permit to Work system to give full control of site work and the use of contractors on site.
  - The use of the Pulse Computer Defect systems to report defects.
  - Site access, inductions, signing in and out of site and detailed log on contact personnel.
  - Full implementation of the Port Maritime Security Plan.
  - Area inspections come out as PM inspection from Pulse.
  - All team members understand the ABM Counselling and Disciplinary Policy and the use of the Fair Treatment Policy.

4.2.1 Quality Control Improvements

- Installation of the Natural Gas system.
- Installation and full use of the new SCADA Citect process control system at the Pellet Plant, Tank Farm and Hot Pellet Screen System. Work has started converting offshore / reclaimer to Citect control.
- Installation of a hot pellet screen system to remove both undersize and oversize material. (+32 to -7).
- Implemented a comprehensive quality drive to improve both CCS and AI on all furnace lines.

- Developing concise operating procedures to ensure furnaces are operated in the most efficient manner and have the minimum amount of disruption and energy reduction.
- Developed and installed an Expert System to sit on top of the Citect system that directs the operator to corrective actions if the operating system goes outside the agreed operating guidelines. This is now been in operation for 2 years. Work has just started on the installation of a system at the Concentrator.
- Construction of new Chemical Lab on site at Port Latta.
- Purchase of XRF machine to assist with all chemical analysis.

4.2.2 Environmental Improvement

- Installation of the Natural Gas system.
- Brief explanation of gas system:
  - Reduction in sulphur discharge to atmosphere of around 50%.
  - Simpler combustion system.
  - Easier to maintain burner system.
  - Much improved safety systems can be used.
  - Less environmental problems with gas than heavy fuel oil.
  - Gas is much more reliable and easier to control than fuel oil.
  - Option to proceed to co-generation.
  - ABM has provided the opportunity to have gas installed to the North West coast, practically to the industrial park adjacent the Port Latta Pellet Plant site.
  - Installation using local contractors, including WA Cromarty, TEC, TPW and Gasco.
- Developing concise operating procedures and the reduction of energy, to ensure furnaces are operated in the most efficient manner and have the minimum amount of furnace bed disruptions. This has seen a reduction of around 60% in furnace blows.
- Use of water cart and sprinkler systems to control dust on the site and close management of dust recording system.

4.2.3 Industrial Relations

- An extremely settled industrial scene has been in place since ABM has taken over the site.
- No industrial disputes on the site for the last 10 years.
- One union site (AWA) 30% membership.
- Flexible EBA which is currently in its second year and will be up for review next September.

- Extensive use of pre-shift toolbox talks to keep all channels of communications open.
- Developed a strong Fair Treatment System to support the conditions given in the EBA.

4.2.4 General Notes

- Pellet production. Planned production this year is 2.33Mt/y of pellets.
- BlueScope takes 1.2 Mt/y and the balance is sent to China. 80,000 t/y of concentrate is sold through Stemcor.
- 100 000 tonnes of pellet chips sold a year.
- Approx 52 vessels per year.
- Good availability on port considering open sea port.
- Current pellet stockpile 226 000 tonnes.
- Current chip/cluster stockpile 18 000 tonnes.
- At Port Latta 75 full time and can use up to 30 contractors on some shutdown days plus 10 casuals on regular basis. There is no contractor agreement with the union and free movement is allowed on and off site by all registered contractors.
- Currently have 9 apprentices on site.

4.2.5 General Improvements at Port Latta

- Best production rate with 4 furnaces has been achieved, up to 7 500 tonne per day (record production last year 2.33 million tonnes).
- Best individual rates achieved on furnaces at 90 to 95 tonne per hour.
- Best quality on a consistent basis. Including CCS and Al although this has been affected dramatically during pit development period.
- Best availability on the pellet plant and ship loading facilities since start up in 1997. Average of 50 ships a year between 45 and 75 000 tonne capacity.
- Installation of a Computerised Maintenance System, an extensive PM schedule system and warehouse issuing system has improved the level of maintenance on the site.
- Use of Project Management System to manage and control costing on all operations and maintain projects within the budget.
- Implementation of an approved Regulated Maritime Port Security Plan by DoTaRS.

4.2.6 Challenges for the Future

- Continue with the good safety performance and provide the safest possible working environment for all employees even though the plant is nearly 40 years old.

- Reduce the cost per tonne of pellets.
- Continue with the drive to improve furnace efficiency and performance thus reducing furnace disruptions and energy requirements.
- Continue to improve productivity and continue to develop loss control systems to overcome the ongoing pressure from consumable price increases.
- Maintaining the existing infrastructure for future development.
- Continue to improve quality to increase customer base.

4.3 Savage River Operations

Concentrator Flow sheet - For the basis schematic of the concentrator plant see Appendix 1.

4.3.1 Flow Sheet Description

- Two lines of production each with an autogenous mill (AM) and a ball mill (BM).
- Material from the autogenous mills is screened via a vibrating screen at 50/60 mm.
- The oversize magnetic material is recrushed using a pebble crusher and returned to the AM.
- The oversize non-magnetic material is conveyed to the cobber reject bin.
- Undersize is slurried and pumped up to the magnetic roughers.
- The tails from the magnetic roughers are pumped to the rougher tails cyclones.
- The overflow from the cyclones is sent to the tails thickener for subsequent disposal in the tailings storage.
- The underflow is screened at the secondary finisher screens, with the oversize from the screens sent to the BM, and the undersize sent to the concentrate thickener.
- The concentrate from the magnetic roughers is sent to the rougher screens.
- The oversize from the rougher screens is returned to the autogenous mills.
- The undersize is slurried and pumped to the ball mill cyclones via the cyclone feed sump.
- Underflow from the cyclones is fed to the ball mill, the overflow is fed to the hydroseparators.
- Underflow from the hydroseparators is fed to the finishing magnetic separators; the overflow is fed to the tails thickener.
- Magnetic material from the finishing magnetic screens is passed over the finisher screens. Oversize is pumped to the secondary finishing screens; undersize is sent to the concentrate thickener.

- Oversize from the secondary finishing screens is returned to the BM, the undersize is sent to the concentrate thickener.
- The finishing screens screen at 100/150 micron, and give a product of 80% passing 43 micron.

4.3.2 General Comments

- The ball mills use a mixture of 25/40 mm balls.
- Mill water tank 2012 will need replacing at sometime but there are no significant problems with it at present.
- Tailings pumps are nearly at their limits of capacity – new tails pumps will be a part of the plan to raise the tailings dam height.
- The tailings dam will be raised a total of 10m. This will be in 2 x 5 m stages.
- ABM is working with KSB to get a longer suction line life for the pumps – currently at 12-18 weeks.
- Mills – repairs to the ends have been necessary by welding.
- AMs – re-welded both ends because of cracks. In addition, stiffeners have been added.
- The fire in the concentrator seems to have had no adverse long term effect.
- The BMs will have new motors by 2012 equipped with synchronous drives.
- The AMs will have speed control to allow either lower power consumption or increased production. The AMs have 2.5MW motors.
- ABM now gets 18 - 24 months of life out of the hot screen mats. Previously this was as low as 3-6 months.
- The top gas water tank will need replacing over the next 5 years.

4.4 Pipeline

- The pipeline receives a stream at 64.5% solids by weight.
- The pipeline is 225mm bore nominal and is 85km long.
- Pipe wall thickness varies between 13.8mm and 6.4mm.
- The velocity when the pipe wall is thickest is 1.9m/s and when it is at its thinnest it drops to 1.7m/s.
- At 65% solids the pipeline will experience saltation in the final stages of the pipeline where the pipe thickness and hence the velocity (see above!) is at its lowest.
- The preferred operational criterion is to pump as coarse as possible. There is some merit in putting the final ball mill at the delivery end of the pipeline because of this.

4.5 Port Latta

Pellet Plant Flow sheet - For the basic schematic of the Pellet plant see Appendix 2.

4.5.1 Flow Sheet Description

- The pelletising plant has five pellet kilns, ABM run four of these at any one time.
- Generally the fifth is used as a standby when the others need prolonged maintenance downtime.
- Piped concentrate is received in concentrate storage tanks.
- The concentrate is thickened via three gravity thickeners.
- Further dewatering is achieved with 6 vacuum filters where the moisture content is reduced to 9.5%.
- The dewatered concentrate is conveyed to the top of the pellet plants where 4kg/t concentrate of bentonite (imported from India) is added.
- The concentrate is then fed into the rotating balling drums where 10-15 mm green pellets are produced.
- The green pellets are mixed with 3-4 kg/t pellets of anthracite.
- The pellets are screened with the undersize being returned to the balling drum inlet, and then fed by an indexing conveyor across the top bed of the kiln ensuring a consistent flat bed across the whole surface and compensating for the curved sides of the kiln.
- The pellet firing process is at 1200 deg C, with one third of the energy coming from the magnetite/ hematite oxidation reaction.
- The remainder of the energy is supplied via natural gas firing and anthracite coal combustion; with the natural gas supplying the majority of the energy input.
- The pellets are discharged at 600-700 deg C, and the off-gas is collected from the top of the kilns at 130-140 deg C.
- The gas is cleaned via a rotoclone system.
- The fired pellets are screened on the hot pellet screens with the +30mm removed and returned to the inlet of the balling drum after being crushed.
- The -7mm material is also separated and sold as a pellet chip product.
- The product pellets are stockpiled with a pellet temperature of around 500 deg C. The pellets need to be retained in the stockpile for at least 15 days to allow cooling to an acceptable temperature for ship loading.
- The pellet stockpile is around 300,000t for this with a minimum stockpile of 150,000t.

4.5.2 General

- The introduction of natural gas in 2002 as the main fuel source has significantly reduced the need for refractory repairs in the pellet kilns.
- The natural gas allows steady temperature control without any high temperature spikes being observed.
- Refractory linings which were last repaired between 1997 and 2002, are still sound and are without any indication of refractory problems being present now.
- Since, this beneficial effect of the use of natural gas is somewhat new there is no experience within ABM on what will be the new refractory life.
- In addition with natural gas replacing coal SO_2 emissions have been cut by 50% reducing acid gas and water.
- The spare pellet furnace (No 4) needs relining for long term operation but can get by until 2010 with approximately $2 M worth of repairs. Burners need to be replaced.
- Rebricking will bring the cost up to $4.5 – $5 M.
- Ore quality – it is not seen as changing outside the sales specification when the new ore is accessed. However, ABM try to restrict the MgO content of the pellet to 2% but it is getting more difficult and on occasions reaches 2.5%.

4.6 Stockpiles and Ship Loading

- An on-going repair and maintenance programme is in place for the offshore structures based on recommendations from consultant reports.
- Painting is also required.
- The structures are now washed down with fresh water; previously this was with salt water which was more damaging.
- The slew bearings on the reclaimer were replaced 2 years ago.
- The conveyor belt to the ship loader was mostly replaced in 1997. Small sections of belt will need to be replaced periodically – see section 5.2. ABM does not appear to have included any significant provision for major belt replacement up to 2022 – ProMet agree that any major cash inclusion for this should be unnecessary.

5. REPORTS OF VISIT FINDINGS

5.1 Process/Plant

Answers to Pre-site Inspection Questions.

5.1.1 Mechanical

(a) Shell thickness measurements on mill shell showing any progressive wear patterns

- Response – shell thickness information was not obtained.

(b) Major mill condition and expected repairs

- Response – answered during pre-site visit discussions – see Section 4.2.

(c) Mechanical maintenance records for last two years to be available to the ProMet team

- Response – actual records not viewed but the general maintenance plan and level of success discussed fully at each site. See Visit Notes – Section 4.

(d) Expectation of major maintenance expenditure items

- Response - As listed in the ABM Financial Report under worksheets
  - DPWIE SRPP Schedule (2): and
  - MLEP 2007 – 2022 Capex - see Appendix 5.

5.1.2 Structural

(a) Structural reports on jetty for last two years to be available to the ProMet team

- Response - Structural reports for the jetty prepared by consultants over the last three years was made available to the ProMet team for inspection during the meeting in Burnie on Thursday 24th April – see Mechanical Report Section 5.3.

(b) Maintenance records of work on jetty for last two years to be available to the ProMet team

- Response - see Mechanical Report Section 5.3.

(c) Offshore condition report

- Response - see Mechanical Report Section 5.3.

5.1.3 Pipeline

(a) General overall state of pipeline.

(b) Inspection reports for last two years to be available to the ProMet team.

(c) Maintenance records for last two years to be available to the ProMet team.

(d) Operational issues

- For Questions (a) to (d) Responses – see Pipeline Report Section 4.4.

(e) Latest PSI report to be available

- Response attached as Appendix 3.

5.1.4 Process/Operations

(a) Reports on potential changes to ore quality

- Response given verbally during site discussions – see Section 4.5.2.

(b) Plans and production predictions for above changes

- Response – no changes planned as newly exposed ore is known from drill samples to be compatible with the product specification and the plant operational basis, although plans are being made to accommodate harder ore if/when this happens.

(c) Studies on elimination of processing bottlenecks

- Response – Not discussed fully with ABM but from previous experience the immediate bottleneck is the capacity of the autogenous mills. As a separate exercise for ABM we are looking at ways of overcoming this.
- Beyond this is the major bottleneck of the pipeline capacity which cannot be overcome as readily.

(d) Pellet quality trends

- Response – this was discussed in Savage River. Ore quality is not seen as changing outside the sales specification when new ore accessed. However, ABM try to restrict the MgO content of the pellet to 2% but it will get more difficult and on occasions may reach 2.5%.

(e) Changes to client specifications

- Response – not discussed but not seen as likely to happen or be an adverse change.

(f) Fuel and energy trends

- Response – changes to natural gas firing had been very advantageous for any number of reasons. The price of natural gas for the remaining life of the plant is discussed in Section 6.

5.1.5 Future Plans

(a) Current ideas on expansion possibilities.

(b) Major expansion projects and costs.

(c) The ABM maintenance plan includes for a refractory reline of the furnaces – can the reason for this be discussed.

- Response – this was discussed see Section 4.5.2

The LOM cashflow budget includes for full relines of the pellet furnaces. This is seen as conservative but prudent at this stage until the extended refractory life is properly evaluated.

(d) What is the state of the load out conveyors and what are the plans for belt etc replacement

- Response – this was discussed, see Section 4.6.

5.2 Mechanical

This report considers the maintenance status and structural integrity of the Pellet Plant with particular emphasis on the offshore ship loading facility.

In January 2008 a structural appraisal report was undertaken by Pitt & Sherry. This categorises the steelwork corrosion into three categories.

- Condition 1 - Slight
- Condition 2 - Moderate
- Condition 3 - High

This can be further explained:

- Action for condition one - Slight

  Structure distress is not considered and should not result in member failure within ten years. However, this could change if the member is modified or subjected to additional loads or a corrosive environment.

- Action for condition 2 – Moderate

  Structural distress should not result in member failure within five years. However, this could change if the member is modified or subjected to additional loads or a corrosive environment.

- Action for condition 3 – High

  Members are subjected to significant structural distress. Failure could occur within two years and could cause harm to personnel.

A team of seven tradesmen are employed full-time in addressing the corrosion problems and to date 25% of all category 3 areas are complete. The remaining 75% are expected to be finalised within eighteen months.

Category 1 and 2 areas will be complete within three years.

It should be noted that fresh water is now used for ‘washing down’ the ship loading structure. This removes a significant reason for corrosion as previously sea water was used and contributed greatly to the problem.

Ship Loader Conveyors – BC39 1 and 2 have had both slew bearings replaced and structural steel repairs are well advanced.

Pellet Stacker has had a structural steel upgrade and the slew bearing replaced.

Main Ship loading Conveyor BC37 is in good condition. A 200 m section which is showing signs of wear will be changed within the next month. (Spare 200 m section is in position ready for change out). Both the drive gear boxes have been completely refurbished.

Bucket Wheel Reclaimers have recently had both slew bearing replaced. Structural steel rectification should be completed with eighteen months.

Within the Pellet Plant the greenball screen installation and overhaul procedure have been upgraded. Top gas improvements in both materials and operational criteria have resulted in extended life in both areas. This allows for longer intervals between furnace shutdowns with resulting cost savings.

In conclusion, the Pellet Plant is in excellent condition. One of the team members who worked as Maintenance Supt., at Port Latta for sixteen years (from 1980-1996) commented on the vast improvements made in both industrial relations and maintenance standards. Since ABM took ownership communications have improved and morale appears to be high. Commitment to the complete plant, both mine and pelletising is in evidence and contributes to a productive environment.

- Savage River Mines Concentrator

This plant appears to be well maintained and in good condition. The Tank Farm is clean and is working efficiently. The Pipe-line pumps are functioning well and the blending and process control improving steadily.

5.3 Electrical

5.3.1 General Comments and Recommendations

This report is based on a 1 day site visit to the Port Latta Pellet Plant and a 1 day visit to the Savage River Mine site.

The report is based on:

- Visual inspection of pellet plant and concentrator sites.
- Discussions with site management, electrical maintenance and reliability personnel.

The electrical and control system maintenance staff on site was in the majority made up of long term employees with a wealth of local knowledge and high level of ownership of the existing plant on site. Most electrical switchgear viewed on site was original installation approaching 40 years old. Replacement programs of switchgear sub elements such as contactors, overloads and the like are being undertaken in a systematic manner to extend

serviceable life and maintain system reliability. General electrical systems housekeeping was of a high standard.

Most of the PLC control systems have been replaced with modern equipment and the existing installation would be contemporary to a modern minerals process plant control system.

5.3.2 Limitations

Due to lack of time no electrical evaluations were made of the following areas:

- Port Latta ship loading, backup diesel generator, stackers and reclaimers.
- Savage River pit electrical installations.
- Slurry pipeline.
- Electrical schematics.
- Electrical engineering data.

It would be reasonable to assume that the quality and maintenance diligence of the unevaluated areas to be a similar standard to that evaluated plant.

Specific recommendations are made for each area of plant evaluated but comments can be broadly summarised as follows:

- Undertake system load flow and fault level studies to ascertain current situation.
- Evaluate suitability of existing switchgear to withstand calculated fault levels.
- Engage a switchboard manufacturer to do a specialist evaluation of existing switchboard structural integrity and insulation systems integrity. (i.e. the equipment that can't be seen from the outside).
- Fast track modernisation of protective relaying equipment to enable fast detection and isolation of electrical faults.
- Do arc fault hazard analysis on existing switchgear and determine in a systematic manner appropriate Personal Protective Equipment (PPE) for switching operations on existing switchgear.
- Install sensitive fire detection systems for early detection of incipient faults before they become fires.
- Continue with refurbishment program of existing switchgear sub-elements.
- Look at pre filtering/cyclone filtering of switchroom outside cooling air to minimise dust ingress into switchrooms.
- Look at fire proof intumescent painting of cabling in switchrooms and at strategic locations in the plant to prevent fire spread along cable trays in event of fire.

From a continuing operations point of view the site maintenance staff have made a good effort to maintain and refurbish existing electrical switchgear and control systems. This however does not guarantee the integrity of this switchgear for future long term operations and a high focus will have to maintained on monitoring, refurbishing and evaluating the suitability of the existing switchgear in light of improving safety standards and increasing system fault levels that may arise due to grid and/or plant upgrades. The overall recommendation is to undertake an engineering study approach on a whole of plant basis (as opposed to specific equipment modernisation/refurbishment approach now in place).

5.3.3 Electrical Maintenance

Electrical maintenance on site is carried out in a professional manner. A lot of work is focussed on life extension and refurbishment of existing 3.3kV and 415V switchgear.

Redundant electrical cabling has been extensively removed at both sites.

New power and control cabling has also been installed in many areas.

Preventive maintenance tools such as regular visual inspections, infra red hot spot thermal imaging and transformer oil testing are built into the overall preventative maintenance plan on site.

5.3.4 Port Latta Pellet Plant Electrical

5.3.4.1 Power Transformers

ABM COMMENTS:

- Transformers
  - 2 x 7.5 /10 MVA Oil Natural Air Forced, original manufacture date 1965 *(1 in service, 1 failed - ProMet comment)*. Load at present 900 amps.
  - 1 x 18 MVA Oil Natural Air Natural, manufactured in 2000. Load at present is 1250 amps.
  - No transformers which are onsite at Port Latta contain PCB as per last oil testing.
  - Oil testing is annually with filtration and stream lining as required. IR inspection is annually.
  - The 7.5/10 MVA unit had a major problem in 1998 in the winding tap changer. This unit was fully repaired and returned to service.
  - The site has a number of 1 MVA dry type transformers. These were re-varnished in 1997 and have provided good service. One unit totally failed and was replaced with a complete new unit.
  - At present there are two new 1 MVA units onsite for immediate change out.

- No spares are held for the Main Supply Units.
- Quotations are being finalized for a replacement 18 MVA unit.
- The new 18 MVA installation is fully compliant for oil containment, where as the 7.5/10 MVA unit has no bunding or catchments.

- HV Cabling

  The cables installed are PLSWA for most of the original installation. New XLPE cables were installed to supply the new 18 MVA transformer and sub mains to connect to the 3.3kv bus system. ABM is currently operating on a set of old mains supply cables. These have had failures in the past and thus the new transformer installation was undertaken. New cables have been installed for a second 18 MVA unit.

PROMET COMMENTS:

- Managed plan to change out original transformers.
- Good maintenance practices.
- Transformers are fitted with neutral earth resistors to restrict earth fault levels.

PROMET RECOMMENDATIONS:

- Assess fault levels on site and suitability of existing switchgear. Larger 18MVA transformers will have increased site fault levels (could be as high as 30kA at 3.3kV/18MVA).

5.3.4.2 3.3kV Switchgear

ABM COMMENTS:

- Equipment is manufactured by Medensha of Japan. Most of the switchgear is the original installation equipment.
- Some HV Motor Starting equipment has been fully refurbished.
- No study has been undertaken as to the suitability of switchgear fault rating to existing system.
- Compliance to current regulatory safety requirement should be investigated.
- There have been no incidents with HV Switchgear at Port Latta.
- Maintenance is schedule via the PULSE system. IR is conducted annually.
- Protection relay maintenance is scheduled to be undertaken this year.
- Some critical spares are available onsite but due to age other items may be hard to obtain.

PROMET COMMENTS:

- MV Voltage is 3.3kV, 3 phase 50Hz.
- Equipment is original supply (40 years old).
- Condition looks reasonable.
- Probable dust ingress.
- Protection relays are typically induction disc electromechanical type.
- Circuit breakers are withdrawable truck type.
- Insulation gloves used during switching. No other PPE evident.

PROMET RECOMMENDATIONS:

- Assess fault levels on site and suitability of existing switchgear. Larger 18MVA transformers will have increased site fault levels (could be as high as 30kA at 3.3kV/18MVA)
- Assuming that existing switchgear has adequate fault rating continue circuit breaker refurbishment program.
- Do arc fault hazard analysis to determine Personal Protective Equipment requirements. Suggest as temporary immediate control the following PPE;
  - ¾ length non flammable PROBAN cotton over jacket.
  - Fire/flash rated full face shield.
  - Leather gloves fitted over insulating gloves.
  - Cotton shirt and trousers.
  - Leather boots.
- Given that fault levels are fixed by transformer size the only strategy to reduce damage from a fault within the switchboard is to provide fast acting protection relay systems. Recommend staged replacement of existing electromechanical protection relays with modern high speed microprocessor based relays with sensitive earth fault, upstream blocking and intertrip facilities to provide rapid tripping and fault segregation without need for grading time delays.

5.3.4.3 Overhead Power Lines

ABM COMMENTS:

- There are no Overhead Power Lines at Port Latta.

5.3.4.4 *Earthing Systems*

ABM COMMENTS:

- Earthing System drawings are available.
- An earthing survey should be conducted to determine effectiveness of system.

PROMET COMMENTS:

- Earthing and bonding was not immediately obvious to view.
- Use of neutral earthing resistors on 3.3kV transformers will significantly reduce risk of touch and step potential issues.

PROMET RECOMMENDATIONS:

- Review earthing design in light of larger transformer size.
- Do formal touch and step potential study to verify within safe limits.
- Do detailed earthing system inspection. CAD welded joints underground are subject to electrolytic degradation and may no longer be effective joints.

5.3.4.5 *415V LV Switchgear*

ABM COMMENTS:

- The system at Port Latta is of a modular design. This allows a prompt change out in the event of a failure.
- Spare modules for all applications are kept in the MCC.
- Most of the switchgear has undergone extensive equipment replacement to current manufactured items.
- The current equipment would comply with regulatory requirements.
- IR Surveys are conducted at least four times per year and these are usually prior to full plant planned shutdowns.
- Visual inspections are carried out regularly as all site equipment is cover within the PM system.
- Critical items are held onsite and other items are via local suppliers.

PROMET COMMENTS:

- LV voltage is 415V 3 phase 50 Hz.
- MCCs are original installation (~ 40 years old).
- MCCs supplied from 1MVA 3.3kV/415V dry type transformers typically installed within the switch room next to the respective MCC.

- Each MCC is protected by a main incomer main circuit breaker.
- Motor starters are typically DOL starting with HRC fuse protection.
- A lot of 415V power and control cabling has been replaced and redundant cabling removed. Most cabling is top entry.
- Existing program in place to rebuild existing motor starter modules.
- Existing maintenance strategies minimise risk of hot joints and subsequent fire risk.
- Dust ingress is evident.

PROMET RECOMMENDATIONS:

- Continue motor starter rebuild program. Consider hard silver alloy electroplating of plug in power contacts to significantly minimise risk of power contact hot joints.
- HRC fuses do not provide rapid fault clearing for typical low level single phase to earth arcing faults (typically in the range of only 1kA to 5kA). Consider utilising rapid acting fault current limiting circuit breakers fitted with earth fault relay operating on circuit breaker shut trip to provide sensitive fault detection and tripping.
- Do arc fault hazard analysis to determine Personal Protective Equipment requirements. Suggest as temporary immediate control the following PPE;
- 2 layers of cotton clothing (e.g. T Shirt under full length drill cotton shirt and trousers or PROBAN over jacket over full length drill cotton shirt and trousers):
  - Safety glasses.
  - Leather gloves.
  - Leather boots.
- Recommend changing out existing 40 year old main incomer circuit breaker with modern day replacement fitted with time delay (~120mSec delay) earth leakage protection to provide backup protection against low level arcing faults.

5.3.4.6 PLC and Controls

ABM COMMENTS:

- The site standard is to use Siemens S7 PLCs. These are a current production item and are fully supported.
- Two Siemens S5 PLC are still operating within the system. These are on limited supply for spares and support is to be phased out. These are planned to be replaced.
- All critical spares are currently onsite which included all components, power supply, communications and processor cards.

- The currently install PLC and Citect SCADA system should provide good process control as both products are fully supported by their manufacturer.
- Emergency support is available 24/7 as an existing support agreement is in place. This is renewed annually.

PROMET COMMENTS:

- The plant has a high level of automation utilising current industry standard PLCs and software systems.
- Significant use is made of supervisory CITECT Data Acquisition System and a purpose designed expert advisory software system to give a high level of plant visualisation, alarming, trending, history and process optimisation.
- Separate PLC processors are utilised for individual furnace control to minimise risk of common mode failure.

PROMET RECOMMENDATIONS:

- None

5.3.4.7 Switch Rooms and Fire Protection

PROMET COMMENTS:

- Main 415V switch room is integrated as part of pellet plant building.
- Heat load inside switch room is quite high due to power transformer losses and transmitted heat from common wall to furnace floor.
- Switch room cooling is via forced external air ventilation and exhaust air ducting.
- Dust ingress is evident but regular housekeeping maintains a reasonable level of cleanliness.
- Switch room is fitted with ceiling mounted smoke detectors for fire detection. Due to high level of external air ventilation and exhaust ducting which will tend to dilute any smoke build up in the switch room until a fire is well established.

PROMET RECOMMENDATIONS:

- Insulate common wall to furnace wall to minimise switch room heat gain.
- Consider fitting cyclone type external air pre filtration followed by duct filters to limit dust build up in switch rooms.
- Consider installing VESDA air sampling fire detection system or smoke detectors installed within switchgear and control cubicles to obtain rapid smoke/fire detection.

- Consider intumescent painting (fireproof painting) of cables within/under/over switch room and major cable ladder runs to minimise propagation of fire along cable trays in event of fire.
- Consider installing HiFog/WaterMisting water fire protection systems under/over switch rooms, hydraulic power packs and hot areas. Water misting systems utilise minimum water and work well within enclosed spaces.

5.3.5 Savage River Concentrator Plant Electrical

5.3.5.1 Power Transformers

ABM COMMENTS:

Power Transformers

- Main units for the concentrator 2 x 12.5/15 MVA ONAF original manufacture date 1965. Loaded at present to 1845 amps and 1236 amps respectively. No oil containment compliance. No spares. Oil was regenerated in Jan 08.
- 1 x 1 MVA ONAN,1 x 2 MVA ONAN,1 x 2.5 MVA ONAN 22kv to 3.3kv units at the crushing station, overland conveyor station and the river pumps. Loaded to between 65 % and 80 % capacity. Common spare held in stock. Contamination control in place. Oil was regenerated in Jan 08.
- Up to 12 dry type transformers between 500 KVA and 750 KVA servicing the distribution requirements of 415v in various switch rooms. Common spare with Port Latta site.
- Maintenance regime consists of annual oil testing, with regeneration of oil as required, as well as IR inspections annually. 3 monthly site checks carried out by ABM electricians for yard compliance, silica gel etc.
- No transformers on site contain pcbs as per latest oil testing results.
- Quotations are being finalized for the replacement of the 12.5/15 MVA units in a new enclosed area, which will cover compliance with standards/regulations.

HV Cabling, Joints and Terminations

Type of HV cabling installed is XLPE which would cover 80% of the Plant HV cabling, the rest is paper lead armour type.

Fault rating would be as per original design spec.

PROMET COMMENTS:

- Good maintenance practices.
- Transformers are fitted with neutral earth resistors to restrict earth fault levels.

- Transformer yard is open style with open bushings and pole top isolators.

PROMET RECOMMENDATIONS:

- ABM suggested that existing 12.5MVA Tx at Port Latta may become available as a common spare from Port Latta and savage River when 2nd 18MVA Tx is installed at Port Latta.
- Ascertain if transformer oil containment compliance is retrospective or not.
- Review HV Danger Signage, Overhead Clearance Signage around transformer compound and cable ladders carrying HV cabling.

5.3.5.2 3.3kV Switchgear

ABM COMMENTS:

- Equipment is manufactured by Medensha of Japan. Most of the switchgear is the original installation equipment.
- Some HV Motor Starting equipment has been fully refurbished.
- No study has been undertaken as to the suitability of switchgear fault rating to existing system.
- Compliance to current regulatory safety requirement should be investigated.
- Main incident with regards to HV switchgear was the result of an operating procedure failure. This was engineered out with castel key interlocks.
- Maintenance is schedule via the PULSE system. IR is conducted annually.
- Protection relay maintenance is scheduled for every 3 years.
- Some critical spares are available onsite but due to age other items may be hard to obtain.

PROMET COMMENTS:

- MV Voltage is 3.3kV, 3 phase 50Hz.
- Equipment is original supply (40 years old).
- Condition looks reasonable.
- Probable dust ingress.
- Protection relays are typically induction disc electromechanical type.
- Circuit Breakers are withdrawable truck type.
- Fault current limiting reactors installed in 3.3kV feeders to 3.3kV MCCs indicating low fault current rated switchgear. This may be a problem if future transformer replacements are larger with consequential higher fault levels.
- Insulation Gloves used during switching. No other PPE evident.

PROMET RECOMMENDATIONS:

Assess fault levels on site and suitability of existing switchgear.

- Assuming that existing switchgear has adequate fault rating continue circuit breaker refurbishment program.
- Do arc fault hazard analysis to determine Personal Protective Equipment requirements. Suggest as temporary immediate control the following PPE.
- ¾ length non flammable PROBAN cotton over jacket.
  - Fire/flash rated full face shield.
  - Leather gloves fitted over insulating gloves.
  - Cotton shirt and trousers.
  - Leather boots.
- 3.3kV motor starters have retrofitted microprocessor based protection relays. Recommend staged replacement of existing electromechanical protection relays with modern high speed microprocessor based relays with sensitive earth fault, upstream blocking and intertrip facilities to provide rapid tripping and fault segregation without need for grading time delays.

5.3.5.3 Overhead Power Lines

ABM COMMENTS:

- Wooden poles with aluminium and copper conductors.
- Pole testing conducted every 3 years by external contractor as part of our pulse PM system.
- Overhead line switches are checked by thermal imaging annually by external contractor.
- Visual inspections are carried out each 6 months by ABM maintenance electricians to check condition of lines/poles and vegetation growth.
- Incidents in regards to overhead power lines have related to lightning strikes, to which lightning arrestors have been fitted to prevent reoccurrences.

PROMET COMMENTS:

- No lightning protection overhead conductors evident.
- Visual warning balls fitted on overhead lines across internal plant road.

PROMET RECOMMENDATIONS:

- Review kA rating and number surge arrestor on 22kV supply. Arrestors should be minimum 10kA rated. Recommend 2 arrestors at each location to give N+1 operation and arrestor surge current sharing capability in high lightning prone areas.

5.3.5.4 Earthing Systems

ABM COMMENTS:

- Earthing system drawings are available.
- An earthing survey was conducted on our main switchyard in Jan 08.
- An earthing survey should be conducted to determine effectiveness of system with regards to the outlying HV installations.

PROMET COMMENTS:

- Earthing and bonding was not immediately obvious to view.
- Use of neutral earthing resistors on 3.3kV transformers will significantly reduce risk of touch and step potential issues.

PROMET RECOMMENDATIONS:

- Do formal touch and step potential study to verify within safe limits.
- Do detailed earthing system inspection. CAD welded joints underground are subject to electrolytic degradation and may no longer be effective joints.

5.3.5.5 415V LV Switchgear

ABM COMMENTS:

- The system at Savage River is of a modular design. This allows a prompt change out in the event of a failure.
- Spare modules for all applications are kept in the MCC. Most of the switchgear has undergone extensive equipment replacement to current manufactured items.
- The current equipment would comply with regulatory requirements.
- IR Surveys are conducted twice yearly and these are usually prior to planned shutdowns.
- Visual inspections are carried out regularly as all site equipment is covered within the PM System. A thermal imaging camera is available on site for follow up work from identified issues.
- Critical items are held onsite and other items are via local suppliers.

PROMET COMMENTS:

- LV voltage is 415V 3 phase 50 Hz.
- MCCs are original installation (~ 40 years old).
- MCCs supplied from 0.5 to 0.75MVA 3.3kV/415V dry type transformers typically installed within the switch room next to the respective MCC.
- Each MCC is protected by a main incomer main circuit breaker.
- Motor starters are typically DOL starting with HRC fuse protection.
- A lot of 415V power and control cabling has been replaced and redundant cabling removed. Most cabling is top entry.
- Existing program in place to rebuild existing motor starter modules.
- Existing maintenance strategies minimise risk of hot joints and subsequent fire risk.
- Dust ingress is evident.

PROMET RECOMMENDATIONS:

- Continue motor starter rebuild program. Consider hard silver alloy electroplating of plug in power contacts to significantly minimise risk of power contact hot joints.
- HRC fuses do not provide rapid fault clearing for typical low level single phase to earth arcing faults (typically in the range of only 1kA to 5kA). Consider utilising rapid acting fault current limiting circuit breakers fitted with earth fault relay operating on circuit breaker shut trip to provide sensitive fault detection and tripping.
- Do arc fault hazard analysis to determine Personal Protective Equipment requirements. Suggest as temporary immediate control the following PPE.
  - 2 layers of cotton clothing (e.g. T Shirt under full length drill cotton shirt and trousers or PROBAN over jacket over full length drill cotton shirt and trousers)
  - Safety glasses.
  - Leather gloves.
  - Leather boots.
- Recommend changing out existing 40 year old main incomer circuit breaker with modern day replacement fitted with time delay (~120mSec delay) earth leakage protection to provide backup protection against low level arcing faults.

5.3.5.6 *PLC and Controls*

ABM COMMENTS:

- The site standard is to use Siemens S7 PLCs. These are a current production item and are fully supported.
- 3 Siemens S5 PLCs are still operating within the system, as a slave for S7 control.
- These are on limited supply for spares and support is to be phased out. These are planned to be replaced.
- All critical spares are currently onsite which included all components, power supply, communications and processor cards.
- The currently installed PLC and Citect SCADA system should provide good process control as both products are fully supported by their manufacturer.
- Emergency support is available 24/7 as an existing support agreement is in place. This is renewed annually.

PROMET COMMENTS:

- The plant has a high level of automation utilising current industry standard PLCs and software systems.
- Significant use is made of supervisory Citect Data Acquisition System and a purpose designed expert advisory software system to give a high level of plant visualisation, alarming, trending, history and process optimisation.

PROMET RECOMMENDATIONS:

- None.

5.3.5.7 *Switch Rooms and Fire Protection*

PROMET COMMENTS:

- Main 415V switch room is integrated as part of concentrator plant building.
- Switch room cooling is via forced external air ventilation and exhaust air ducting.
- Dust ingress is evident but regular housekeeping maintains a reasonable level of cleanliness.
- Switch room is fitted with ceiling mounted smoke detectors for fire detection. Due to high level of external air ventilation and exhaust ducting which will tend to dilute any smoke build up in the switch room until a fire is well established.
- There is limited water sprinkler fire protection system under concentrator plant electrical switch room.

PROMET RECOMMENDATIONS:

- Insulate common wall to furnace wall to minimise switch room heat gain.
- Consider fitting cyclone type external air pre filtration followed by duct filters to limit dust build up in switch rooms.
- Consider installing VESDA air sampling fire detection system or smoke detectors installed within switchgear and control cubicles to obtain rapid smoke/fire detection.
- Consider intumescent painting (fireproof painting) of cables within/under/over switch room and major cable ladder runs to minimise propagation of fire along cable trays in event of fire.
- Consider installing HiFog/WaterMisting water fire protection systems under/over switch rooms, hydraulic power packs and hot areas. Water misting systems utilise minimum water and work well within enclosed spaces.

5.4 Pipeline

5.4.1 History

The Savage River slurry pipeline was originally commissioned in June 1967 with a 20 year design life and, with the exception of a six month period in 1997, has operated continuously since that date. The originally specification called for a fine ground magnetite slurry of 60% density by weight and with 80% passing 43micron. The design flow rate was set at 4,325l/min.which gave a throughput of 300tonnes per hour (tph). With the operational availability set at 85% this gave an annual tonnage through the line of 2.25Mt/y.

All of these design parameters have been exceeded over the life of the operation.

In June 2006, at the request of ABM, the US company Pipeline Systems Inc. (PSI) conducted a full audit of the line to estimate the remaining life left within the 85km pipeline and look at a possible tonnage increase. Ref Appendix 3, PSI report number 1304-G-001_Rev.B. This report is currently the most detailed and can be regarded as accurate for future planning.

5.4.2 Current Operation

Currently the system runs at around 340tph, with an availability of 95% with slurry pumped for approximately 80% of the time. Of the remaining 15% unused availability approximately 10% is taken up by water pumped due to lack of slurry, the remaining 5%, however, is used for operational and maintenance purposes.

Operating at these levels the existing system has a capacity of 2.38Mty, however the potential exists for a 2.68Mty production level without any

modification or up-grade if the 10% water pumping time could be utilised for slurry.

5.4.3 Density Limitations

In the operation of a pipeline the slurry density level is set by a number of factors, including the velocity, particle size, particle shape and the viscosity of the slurry. These factors in turn determine the point at which settling will occur in the line and hence the speed above which the pumps need to operate.

During the period of operation by the original owners, (PMI and Cleveland Cliffs), tonnage increases where gained by increasing the slurry density. This was raised progressively from the original design density of 60% up to 65% over a number of years giving an increase in production up to 352tph. Beyond this 65% density level it was found that the pressure rose rapidly giving indications that slurry was settling in the line.

This 65% density limit, and 90% availability, was considered by the original Savage River owners as the system limit. At these levels the pipeline had a theoretical capacity of 2.75Mty, which is higher than the current 2.68Mty figure quoted.

In 1998 ABM modified the ball mills at Savage from grate discharge to overflow configuration. This was done to grind finer and improve pellet quality. Whilst still maintaining the top level in particle sizing, these modifications seem to have changed the particle size distribution, and with it the viscosity. As a result there are some indications that the 64% density, currently set by ABM, may now be on the edge of the settling point in the thin wall pipe sections in the lower half of the line.

If this is so the original top density limit of 65% is no longer practical, and any future change in grind, for quality, may also impact upon tonnage.

As no detailed rheology work has been undertaken on the Savage River slurries for a number of years these facts remain to be verified.

5.4.4 Possible Improved Availability

The main pipeline pumps are currently limited on both motor power and bearing load. A number of possible up-grades that could improve pump station availability have been reviewed over recent years. These also included the addition of a 5th pipeline pump.

Some of these items have been covered in the PSI audit and are currently included in ABM's future budget for the system.

Even without the need to increase pipeline throughput there are many advantages of adding a 5th pump to the station. From the point of breakdowns an improvement of 2 – 3% could be obtained in station availability. This would mainly stem from improved maintenance resulting from the use of 4 pumps in place of the current 3 that are required to operate in tandem and the improved stand-by capacity of the station.

Other upgrades, including increasing the motor size on the pipeline pumps and upgrading the bearing capacities within the pumps themselves, could see increases in pumping pressure and line velocity. In the case of increased line velocity this would enable some increase in the slurry density previously lost by finer grinding, however the condition of the pipeline will not permit any great increase in line pressures.

5.4.5 85 km Slurry Pipeline

In the 40 years of its operation the line has seen only 6 failures. Of these one was due to the break up and jamming of a pipeline pig, one due to overpressure stemming from operator error and the remainder due to external corrosion matching up with internal pitting.

Attempts to calculate the remaining life left within the pipeline have been difficult as the line has not been subject to normal wear. It was assumed that slurry moving through the line would cause wear around the pipe with possibly heavier wear on the bottom of the pipe. This has not been the case.

Rather than abrasive wear the inside of the pipeline has built up an internal coating of calcium and magnetite forming a layer approximately 2mm thick. (The calcium is from lime added to the slurry for pH control). This build-up has effectively put a lining on the inside of the pipe, which has helped reduce internal wear.

Internal corrosion has been limited to pitting of the steel pipe wall underneath this build-up. This has resulted in the inner surface of the pipe being covered with small pits ranging from 1 to 6mm in diameter and up to 3mm deep. The density of these pits is high with up to a dozen existing in any 1cm square. See Appendix 3, particularity Section 8.6, for fuller explanation of the problem that may result from such corrosion pits especially in the 6.4mm pipe.

This pitting, and the internal build-up, is uniform around the inside of the pipe and along its full length. The effect of the pitting in the line would normally result in a very high friction factor, and produce high line pressures, if it was not for the smooth build up that has covered them.

Ultrasonic inspections taken over the years has shown that the rate of growth of these pits has slowed down, possibly as a result in improvements to the pH and oxygen scavenger systems, and possibly because the internal build up has tended to pacify the pitting mechanism. (ABM currently undertakes these inspections approximately every two years with the next one due now).

5.4.6 External Corrosion

External corrosion on some sections of the pipeline has been of concern for a number of years and is a direct result of only limited line maintenance being undertaken since 1994.

The condition of the line, and these problem sections, are covered in some detail in the 2006 PSI audit. This recommended an extensive work program,

included painting on above ground sections and some wrapping replacement on the underground sections of the line. This work on the external coating is scattered along the length of the pipeline in lengths ranging from a few metres up to 1.2km.

Most of the 8km of pipe involved in these sections is thin wall (6.4mm) material that was lifted out of the ground in the 1980's and never re-buried. Approximately half of this raised line was painted and left on timber supports whilst the remainder was wrapped with a tape coating with the intention of it being re-buried, an action that never took place. Having been left on the surface this tape coating has been badly affected by UV radiation and no longer offers any protection to the pipe.

In the program outlined in the PSI audit the heavily corroded sections are to be identified and the pipe replaced were necessary. Up to 3km of the thin wall line (6.4mm) is to be ordered for this work together with approximately one kilometre of heavy wall pipe (13.8mm) for the diversion around the extended open-cut at Savage.

With the decision by ABM to extend to a 2021 closure date the long outstanding work program has now started. Some small areas of exposed line in the Arthur River area have been painted together with the high level 300m span across the Savage River, however it will be essential that the line, and its condition, be fully evaluated and a work program produced that spans at least a 5 year period.

Any sections of the line to be replaced need to be identified and a plan produced for each location. The replacement of any pipe sections needs to be planned to coincide with common equipment shutdowns. Work involving cutting the pipeline should be carried out at simultaneously at multiple locations to reduce the total number of line drainage operations associated with such activities.

5.4.7 Extended Line Life

It is expected that the line will continue to deteriorate slowly. Although the heavier wall sections of the line will be able to resist these problems the thin wall (6.4mm) pipe represents the major area of concern. The bulk of this lies in the Arthur River valley between mile pegs 32 to 50.

In this section of the line the normal operating pressures are low but the shutdown pressures, especially with slurry in the line are high. It follows that if failure occurs it is likely to be with a full line of slurry and following a pump station shutdown.

This problem has been reviewed and can be relieved by the installation of a remote line closure valve approximately 53km from Savage River. This effectively splits the static head pressure into two halves in this area easing the load on the weaken pipe.

It is unlikely that this system will need to be installed within the next 5 – 8 years but, once in place, should buy some years of extra life for the line.

5.4.8 Line Failures

Whilst the occasional line failure is a probability repairs can be made rapidly and with little impact upon the environment. To do this ABM has to accept the situation, and put increasing emphasis on a rapid repair system and the personnel to operate it. To this end a quick strike vehicle is necessary equipped with cutting and welding equipment and spare pipe in 2, 3 and 5 metre lengths. It is also necessary that stores and equipment, needed to set up a camp on the site of the repair, can be mobilised rapidly.

Under ideal conditions a repair should be practical within 24 hours of a failure occurring. (As an example Freeport Mine records a number of failures within their 100km multi line system each year. They can cut out, and weld in, a new 12m length of pipe within a few hours).

5.4.9 Pipeline Right of Way

To enable the pipeline maintenance program to function it is essential that the access road along the line also be maintained. Like the pipe maintenance this had received little input since 1993. To meet this problem ABM has now started some major projects on the road, these included the reconstruction of the 70 metre long Arthur River Bridge plus some painting of exposed pipe spans.

In the past is was found that optimisation of the work force was possible if pipe maintenance, including wrapping and painting repairs, was carried out in the warmer period from November to May. The colder and wetter periods then utilised the same crew on road, bridge and drainage culvert repair. Initially the work level required to get the pipe and road up to an acceptable standard may not permit dual labour usage but it should be aimed at as a long term policy.

As the pipeline ages the time intervals between any problems will shorten. This means that the need for a line maintenance crew, and a good access road, will become increasingly critical. Allowance needs to be made outside the short term maintenance budget for this.

5.4.10 Environmental Impact from Line Failure

There should be no great environmental concerns resulting from a slurry spillage from a pipe failure. Magnetite is not a toxic material and actually occurs in the form of heavy black sand in many west coast creeks and rivers. On previous pipe leaks little attempt has ever been made to clean up the spillage. In these locations the local vegetation has always returned and, after as little as two years, the sites have been indistinguishable from the local bush along the road.

To get the EPA view of this Grange Resources should request comments from their environmental consultants.

6. ISSUES FOR CONSIDERATION

6.1 Red Flags

No fatal flaws are understood to exist within the plant operations area.

6.2 Significant Factors to be Understood and Controlled

6.2.1 Current Mining Plan

- ABM has nearly reached the limits of the accessible ore in their current main mining area. This part of the mine is 250m deep and the wall angles are such that the mine area is becoming too small an area to efficiently continue mining.
- ABM is presently further developing this mine area by extending the area of the mine from the surface level downwards.
- The availability of new mined ore would be limited for three to six months while the new ore is exposed. ABM intended to use stockpiled ore to allow continued operation during this time.
- While it is understood that there is probably only enough stockpile for the planned operation it is considered that the ABM planning and capability to do this successfully should be checked.
- After this it is understood ABM will have sufficient quality ore until 2022.

6.2.2 Long Term Mining Plan

- ABM plans reveal that they have in mind to mine in excess of consumption for a considerable number of years.
- ABM plan to accumulate about 20M tons of ore during this period which will gradually be consumed over the last few years of operation.
- This plan appears to load costs in the early years with the returns only coming some years later. This needs reviewing.
- Physical location of a 20Mt stockpile would seem to be a significant issue on the ABM site.
- Most if not all the 20Mt would be double handled again increasing costs.

The autogenous mills are presently understood to be marginally grind limited, i.e. the hardness of the ore is not just sufficient to achieve the aim grind size. As the North pit is developed it is understood the ore will get appreciably harder and the above problem should disappear for awhile. As the ore gets even harder, the autogenous mills will become power limited in trying to achieve (and possibly failing) the required throughput. See Risk Analysis, Section 8

6.2.3 Sustaining Capital

- ABM has passed over their capital expenditure plan. This seems to be very comprehensive with a good deal of planning involved.
- It is believed that some of the more significant items can be eliminated or achieved in a more cost effective.
- It is also believed that there is minimum risk of any significant increase in the budget as presented; discounting force majeure type events similar to the fire they had two tears ago.
- The plan includes considerable allowances for maintaining and upgrading the electrical and computer systems, and also for monitoring and repairs for the pipeline as would be expected. It is not possible within the scope of the ProMet exercise to analyse the size of these allowances with respect to details of the ABM plan for future work content.

7. SWOT ANALYSIS

STRENGTHS

- IN PRODUCTION WITH ESTABLISHED CUSTOMERS.
- KNOWLEDGE OF HOW TO MINE AND BENEFICIATE MAGNETITE IS UNIQUE IN THIS AREA OF THE WORLD.
- ABM HAVE RECENTLY RENEWED THE MAJORITY OF THEIR MINE FLEET AND DRILLING RIGS.
- PLANTS AND WORKFORCE ARE HIGHLY MOTIVATED AND ARE NOW WORKING AS A COORDINATED OPERATION (SAVAGE RIVER AND PORT LATTA OPERATIONS).
- COMPETENT OPERATORS WHO HAVE DEMONSTRATED THE ABILITY TO COPE WITH SERIOUS ISSUES – THE FIRE AND THE PIPELINE FAILURE – AND RAPIDLY RESOLVE.
- BOTH PLANTS HAVE BEEN ASSESSED BY VIRTUE OF OUR TWO DAY VISIT AS IN "GOOD TO EXCELLENT" CONDITION AND WELL MAINTAINED.
- THE EXTENSION TO THE PIPELINES LIFE WOULD APPEAR TO BE MANAGEABLE WITH CARE.
- ALREADY CONVERTED TO GAS GIVING LONG REFRACTORY LIFE AND LOWER COSTS.
- ELECTRICAL COSTS ARE BASED ON COMPLETED HYDRO SCHEMES – OSTENSIBLY SHOULD NOT BE SUBJECTED TO CARBON TAXES.
- GOOD WATER SUPPLIES.
- EXCELLENT SAFETY RECORD IN COMPARISON TO LIKE OPERATIONS.

WEAKNESSES

- COST TO MINE ORE IS RELATIVELY HIGH FOR THE REMAINING MINE LIFE – WHICH IS AN ISSUE IF ORE PRICES FALL.
- PRESENT MINE PLAN NEEDS THE MINE FLOOR TO BE LOWERED BY 270M TO GIVE AN OVERALL MINE DEPTH OF 520M
- PLAN TO MINE ABOVE CONSUMPTION WITH CONSEQUENTIAL HIGH STOCKPILE REQUIREMENT NEEDS TO BE CHALLENGED
- ANY INCREASE IN LOAD ON THE PIPELINE MAY GIVE RISE TO UNKNOWN ISSUES
- ANY NECESSARY REDUCTION IN ORE GRIND SIZE BECAUSE OF THE DIFFERENT ORES TO BE MINED MAY REDUCE PIPELINE CARRYING CAPACITY
- CURRENT CRUSHER FEED SYSTEM REQUIRES DOUBLE REHANDLING WHICH IS VERY EXPENSIVE.
- PLANT IS 40 YEARS AND WELL MAINTAINED BUT STILL SUSCEPTIBLE TO UNEXPECTED FAILURES – ESPECIALLY WITH THE PIPELINE.
- ACCESS TO THE PIPELINE FOR MAINTENANCE IS VERY LIMITED AT PRESENT
- CAPACITY LIMITED BY PIPELINE CAPACITY – WHICH CAN NOT BE CHEAPLY INCREASED.
- AUTOGENOUS MILLS MAY NOT BE ABLE TO KEEP UP WITH THEIR REQUIRE DUTY IF THE ORE BECOMES

HARDER.

OPPORTUNITIES

- THEY HAVE A SPARE PELLETISING CAPABILITY AT PRESENT IF ALTERNATIVE CONCENTRATE SUPPLIES CAN BE DELIVERED TO PORT LATTA. A PRACTICAL MEANS OF DELIVERING THIS TO THE SITE WOULD BE NEEDED
- BELIEVED A 15-20% INCREASE IN PRODUCTION CAN BE ACHIEVED WITH RELATIVELY MINIMAL EFFORT AND COST – COMPARED TO NEW DEVELOPMENTS.
- ABM BELIEVES THEY CAN GET ADDITIONAL ORE ONCE THEY RUN OUT EITHER BY REPEATING THE CURRENT MINE EXTENSION PLAN.
- EXTENSIONS TO THE TAILINGS DAM DOWNSTREAM OF THE CURRENT FACILITIES MAY HELP TO RESOLVE SOME REHABILITATION ISSUES.
- PLANS ARE IN HAND TO REHABILITATE THE RAIL LINE BETWEEN BURNIE AND SMITHTON WITH FEDERAL FUNDS, WHICH MAY PROVIDE A MEANS OF DELIVERING SUPPLIES TO SITE OF BENTONITE AND COKE AT REDUCED COSTS.

THREATS

- ORE PRICE DOES NOT STAY AS HIGH AS IN THE ABM FORECAST FROM THREE YEARS OUT.
- GAS CONTRACT HAS A LIMITED DURATION AND WILL NEED RENEWAL IN THE NEXT 4 YEARS.
- INCREASING PIPE FAILURES IN THE NARROW WALLED SECTIONS NEAR PORT LATTA MAY OCCUR – RISKING LINE BLOCKAGES AT EACH RESTART.
- WALL FAILURE IN THE NORTH PIT WILL AFFECT ACCESS TO ORE – ESPECIALLY WITH VERY HIGH WALLS.

8. RISK ANALYSIS

No red flags or fatal flaws are believed to exist within the plant operations area.

A List of the Secondary Risk Issues found during the plant visit within the Operating Plants is given below. A more in-depth plant review may reveal others:

Risk Issue	Recommendation
Potential for Increased Production	
• The immediate bottleneck is the capacity of the autogenous mills. As a separate exercise ABM are looking at ways of overcoming this.	One of the risks of the future operation is that the ore will be progressively harder than they have treated so far. Information provided is that the % of time on power control has increased from 30% to 70% over the years as North Deposit ores are treated. The initial suggestion is that some comparative grinding tests be carried out to assess the likely impact or probability of this. The possible solutions, if this is the problem are: • To crush finer at the primary crusher • To increase the size of the pebble ports at the AGs to allow more material to exit the mill and go to the recycle crushers - but this will need forward planning • To increase the vibrating feed aperture size - with some issues around pump wear Essentially this is a problem which should be capable of being managed with minor plant modifications. To understand what can be done in this area will need a separate engineering and cost study.
• Beyond this is the major bottleneck of the pipeline capacity which cannot be overcome as readily.	None

Risk Issue	Recommendation
Mining Issues	
• Cost to mine ore is relatively high for the remaining mine life – which is an issue if ore prices fall.	• Potentially, it is understood that major operating cost savings are probably not possible to achieve. However, while the overall production cost at ABM is reasonably on a par with the predicted costs of new magnetite concentrate / pellet plants the ratio of Opex/Capex is such that it will make it harder for ABM to avoid losses if the market turns down drastically. A separate study would be needed to see if any useful on-going savings are possible. It is believed that, if necessary, a substantial part of the capital budget can be deferred or eliminated
• Present mine plan needs the mine floor to be lowered by 270m to give an overall mine depth of 520m	• To be commented on by a Mining consultant
• Plan to mine above consumption with consequential high stockpile requirement needs to be challenged	• The rational for this needs studying
• Wall failure in the pit will affect access to ore – especially with very high walls.	• To be commented on by a Mining consultant
Pipeline	
• Any increase in load on the pipeline may give rise to unknown issues • Any necessary reduction in ore grind size because of the different ores to be mined may reduce pipeline carrying capacity • Plant is 40 years and well maintained but still susceptible to unexpected failures – especially with the pipeline. • Access to the pipeline for maintenance is very limited at present • Increasing pipe failures in the narrow walled sections near Port Latta may occur – risking line blockages at each restart.	• See comments from the ProMet pipeline consultant - a separate in-depth study covering all aspects of the pipeline operation and maintenance may be necessary depending on the effect of future plans on the requirements for pipeline performance

9. UP SIDE POTENTIAL

9.1 Increased Pipeline Capacity

See Appendix 3 and Section 5.4 for in-depth discussions on this subject.

Basically, the capacity will be governed by the grind size and the pipeline availability. The maximum carrying capacity can be compromised by a non-optimum (as at present) particle size range and lack of pump capability and availability. With these factors at their optimum the maximum carrying capacity of the pipeline is considered to be 2.9 – 3.0 Mt/y.

9.1.1 Grind Size

The coarser the grind size the higher the pipeline carrying capacity – within limits. The grind size would appear to have been reduced with a change to the ball mill discharge arrangement (see section 5.4.3) some time ago that has appeared to reduce the maximum slurry density from 65% to 64%.

Further changes as harder ore is mined need to be carefully assessed as to the effect of this on the pipeline. If this has the effect of further reducing the maximum density, the possibility of a coarser grind only being used at the concentration plant with the final grind at the pellet plant may need to be investigated.

9.1.2 Pipeline Availability

ABM already has plans for the fifth pump which will give higher availability. This together with reduced water pumping periods will help increase the pipeline slurry carrying availability up to the maximum considered possible of 92-93%.

9.2 Additional Pellet Production Capacity

9.2.1 Use of Existing Standby Furnace

- ABM has a fifth furnace which generally acts as a standby for the other four –this is believed to be No4 Furnace and is in need of repairs at $2M and at some later date new refractories at a further $2.5M. The four operating furnaces are down for about 2 weeks each in a year so the standby furnace could be operated for 8 weeks on the present operational basis.
- On a preliminary basis there is scope to use the fifth furnace alongside the other four which, if alternative ore supplies can be delivered to Port Latta, could give a 15-20% increase in production.
- It is estimated this could give a pellet production of 2.9-3.0Mt/y. This is also the ultimate capacity of the pipeline so it could be a possibility without Grange concentrate.

9.2.2 Additional Pellet Production Capacity

- Adding a new shaft pellet furnace/s is not so readily done and would need some investigating. ProMet doubts there is room in the pellet plant building so an extension would be needed. Extensions to the existing conveyor systems/piping systems would be required which would entail downtime.

9.3 Supply of Additional Concentrate

9.3.1 From Savage River

- As noted above, the pipeline capacity may be adequate to supply sufficient additional concentrate to allow the possible pellet production increase obtainable by using the fifth furnace.
- However, this needs to be approached with caution as any increase in load on the pipeline may give rise to unknown issues and any reduction in ore grind size because of the different ores to be mined may reduce pipeline carrying capacity
- Plant production above this is limited by pipeline capacity – which can not be cheaply increased.

9.3.2 From Grange Resources

On a life of mine/quality of pellet scenario it may be more beneficial to bring in Grange concentrate. Initial concepts for this suggest using a Marconaflow device in the ship to slurry the concentrate which then would need to be fed to the blending thickener or concentrate day tank for mixing with the ABM concentrate. This would require additional pumps at the wharf and a new pipeline from the end of the wharf to the thickener. There is an adequate existing water pipeline to the end of the wharf. This would not be too costly and could be readily done (first impressions). However, this still needs to be fully costed given that the shipping costs of the ore would add to the already high ABM pellet production costs.

10. BALLPARK SCOPE/ COST ESTIMATE TO ALLOW AN INCREASE IN PELLET PRODUCTION TO 2.9MT/Y

ProMet have been involved with two projects to look at increasing the production at Savage River.

10.1 Expansion Project Review

The first project in 2007 came to the conclusion that any project which exceeded the capacity of the current pipeline was not economic which meant that 2.9Mt/y, which we were informed was the pipeline capacity, became a capacity restraint. The option to produce 2.9Mt/y would cost approximately $52m (2007 costs).

If the pipeline problem can be overcome, an increase to 3.6Mt/y would cost $180M (2007 costs) and an expansion to 6.5Mt/y would cost $830m (2007 costs). However, these studies did not include extra pelletising capacity which would stay at 2.9Mt/y.

The 2.9Mt/y case involved an additional part line to handle half the tonnage of a current line. The pipeline capacity could be achieved with a relative minor upgrade to the pump station to increase the overall station availability by the installation of a fifth pump. The pipeline can only operate when three pumps are available and with four pumps this can be less than 95% of the time. With five pumps this increases to close to 99.5% of the time which means the line can more reliably achieve the higher capacity.

The 3.5Mt/y case involved a new processing line, an intermediate pump station to allow higher pumping rates approximately half way along the pipeline and a facility to handle 1Mtpa of concentrate exports including filtering station and modified shiploading facilities.

The extra concentrate in either of the last two cases could be loaded using the current methods. The major extra cost at the port – other than recommissioning the furnace was to install extra filtering capacity.

10.2 Review in 2008

In 2008 ABM informed ProMet that they had been told by the mills suppliers that the modifications to the Autogenous Mill shells may not be sufficient to last beyond five to eight years and they were interested in combining the expansion project with a strategy to provide a new front end to the plant to remove any risk to a long term operation. ProMet looked at 7 options involving a new autogenous mill, various mill configurations and potential circuits using HPGR technology. These were costed at a scoping study level to assess the projects which were worthy of further investigation. The issues revolve around the delivery time for major equipment – especially large mills – within the time frame that either of the current mills needed major repairs.

The conclusion was reached was that the lowest cost option was a crusher/HPGR circuit, with an additional ball mill to operate in parallel with the current mills. This cost – at a scoping study level - was approximately $85M

though additional costs would be incurred for modifications to the infrastructure.

Using an autogenous mill circuit was some $8 to $10M more expensive.

11. COSTS OF AN EQUIVALENT SIZED GREENFIELD PLANT

A rough estimate of the current replacement value of the entire ABM operation (mine, pipeline, pellet plant and port facilities etc) would be at A$280 – A$370/annual t of pellets i.e. A$810M – A$1080M for a 2.9Mt/y plant. With 2.9Mt/y plant being relatively small when compared with the general sizes of plants use to assess this price range it would be expected that the replacement value would be towards the high end of the range.

At this stage this cost is just an indication/opinion only based on new projected projects with similar facilities. The cost number includes:

- Capitalised pre-strip.
- All mining equipment (no contractor mining).
- Magnetite beneficiation plant.
- Pipeline (100km).
- Pellet plant.
- Port stockyard and loading wharf.
- Power supply from local source.
- Water supply from local source.

The plant production basis would be to produce 2.9mt/y of fired pellets, from magnetite ore with a DTR of 35% giving a pellet grade of 68% Fe.

The price is sensitive to:

- Location – supply of power, water etc. Length of pipeline.
- Strip ratio – the above price is based on 1.5:1
- Supply – the above price has the pellet plant only being supplied from China.

12. FINANCIAL

12.1 Financial Notes from ABM Meeting

- ABM will announce an increase in reserves to 132M shortly.
- The use of 86M t of this by 2020 takes up all the extra capacity of the tailings dam when they raise it by 10m. ABM has identified a second location for tails storage once this dam is full.
- The new trucks are on a 60 month lease arrangement.
- All trucks are brand new.
- Maintenance of the mobile equipment is undertaken with 26 sub-contractor personnel and 12 Savage River employees.
- "Eurest" are contracted to provide catering and messing.
- ABM have a hedge in place for when the Aus$ goes above US$0.90.
- ABM needs foreign exchange for diesel and bentonite purchases.
- The gas is purchased in Aus$. The contract price escalates according to CPI and includes a fixed and variable component. It will revert to all variable after 2012. *(Azure Capital to note).*
- Revenue is in US$.
- Electricity Contract – 50% is at a fixed price with the next 50% variable and changes over each day.
- The financial budget includes for the costs of a 2 week shutdown for the pellet furnaces, excluding refractories. The costs include sub-contractor man hour costs but not the man hour costs of ABM employees.
- Ore usage – the budget includes for 70% high grade ore and 30% low grade ore. In actuality they are achieving product grade with 50% high grade ore and 50% low grade ore. (Low grade ore is 26% DTR planned and 33% DTR actual). *(This may be viewed as giving a reasonable up-side – to assess the effect properly would need a separate study).*
- The capital budget includes for replacement shells for the Autogenous Mills. The crack repairs undertaken in 2005/6 only have a 5 year guarantee and ABM feel they need to include the shell replacement costs. They will be able to maintain present production when the shells have been replaced. (ProMet feel this is being overconservative – no welding contractor would ever give longer than a five year guarantee even if they expected it to last much longer. A five year guarantee in itself is a good measure of the repair quality that was provided).
- The pellet furnaces are generally fully refractory lined on average every 15 years with 19 years being the best achieved.
- The revenue is presently calculated using a 30% pellet price increase from this year. The actual will be 86.67% or higher depending on on-going negotiations.

- The pellet price is then reduced in increments to below today's price.
  - 2009 --8%
  - 2010 0%
  - 2011 0%
  - 2012 0%
  - 2013 -14%
  - 2014 -10%

12.2 Comments on ABM Financial Budget

The financial data included in the ABM Budget differs somewhat to the Azure Capital Physicals Summary. Some changes may be necessary to the Azure Capital summary but it is believed these will not alter the outcome appreciably.

Points of note for the ABM budget:

- The individual Opex numbers are based on reality. It would be presumptuous of ProMet to suggest they were wrong in anyway.
- Similarly the individual Capex numbers need to be presumed correct.
- For the Opex make-up we would question the logic of ABM mining ore earlier than required and capitalising a portion of the work. This gives two problems – the stockpiling and extra equipment costs and lack of traceability of ore quality leading to processing difficulty later on.
- For the Capex we would question the need for some capital items included in their list. On the basis we believe they have over-estimated the Capex it may be better to stay with their numbers.
- Revenue – their information suggests the Shagang price does not stay at the contracted rate. Either it changes during the year or at a point when there has been a specific off take tonnage shipped to them. Maybe we need more explanation of this.
- Revenue – BlueScope seem to pay at a premium rate for two months of 2008.
- Revenue – ABM have not adjusted to the 86.67% increase until later in the year for the BlueScope sales. They include only 30% for this increase which they admit they will need to up-date when the final deals are in place.
- The ABM price as of now at $74.94 would be $139.9 if the 86.67% increase was applied. Azure Capital has calculated the price as $143 – it is not known what the basis for this is.

12.3 Review of Budget for Production at 2.33Mt/y

ProMet Engineers has been party to reviewing the financial forecasts for the Mine Life Extension Plans for two cases, viz:

- Operations until 2018
- Operations until 2035

Comments relating to these reviews are given earlier in the report. In general, ProMet believes that provided the comments above can be addressed or dismissed the financial forecasts are sound. ProMet has undertaken the development of many such financial forecasts for other potential magnetite concentrate and pellet producers and the costs used by ABM are consistent with costs used by ProMet for these projects. In some cases, the ABM predicted costs were better than expected. These were discussed with the ABM personnel during the site visit and full and satisfactory explanations for the improvements were given.

12.4 Review of Budget for Production at 2.9Mt/y

The amended financial forecast for the higher production case at 2.9Mt/y has similarly been reviewed by ProMet. In ProMet's view this new forecast is properly based on the present known cost structure of the ABM operation, and while the comments from Section 12.3 still apply, ProMet believes this forecast is again consistent with the expected costs numbers.

There is a possibility that the production costs for the new tonnage may be marginally better than for the existing output since it is planned to use a more efficient milling system. However, any such improvement would not significantly alter the results of the financial model and since the development of the up-grading project is not so advanced as to allow an accurate prediction of the improvement we consider this can be ignored for the review.
The new financial forecast includes a capital allowance for the necessary equipment to allow the extra production to be realised of A$62M. In ProMet's view this allowance is adequate for the up-grade project.

13. LIFE EXTENSION TO YEAR 2034

As a late addition to the ProMet scope of work Grange Resources requested comments on issues that might arise if the extension plan for ABM was extended from 2022 to 2034.

Since, this was not understood at the time of the visit to the ABM site some of the more relevant questions for this exercise were not asked and at this stage it is proving difficult to comment fully and properly.

Since, it is so far into the future it has been assumed that ABM have kept the operating cost items at today's values and allowed them to be inflated against an ABM inflation factor. As for revenues that it is too far into the future to be predicted and ProMet declined to comment.

As ProMet were unaware of this additional requirement during the visit some of the issues were not recognised and therefore the right questions were not asked. However, the following list is a starter short list of comments for consideration:

1. The extra ore is either from an extension of the South pit or from the exploitation of the Long Plains deposit. See notes of discussions with M1 below clarifying this.

2. ProMet understands that any ore from the South Pit extension is significantly softer than the present ore, and the ore to be mined over the next ten years or so from the North Pit. If this is true, then the ability of the autogenous mills to grind the ore as required would be compromised. Either new mills such as HPGR mills would be needed or the mine plan would have to be radically altered. The new mine plan would need to make the softer ore available over the next few years so that it could be blended with the harder ore throughout the full projected life of mine giving the autogenous mill enough hard material for the grind.

3. For the pipeline, this will have had 60 years or so of life by the end. It is ProMet's view that it would be prudent to allow, say, 10kms of pipeline to be replaced each year in the budget. Again, if this is agreed it would be more beneficial to start the replacement programme in the next few years rather than leave it until 2023.

4. On the electrical side, ProMet would have taken a different view of the equipment capability to survive and be acceptably safe if the longer extension was known about at the time of the visit. Such things as the HT supply system; the bus bar system etc should preferably be inspected by an electrical specialist. Transformer renewal at the pellet plant site has already been achieved or planned and we understand is under consideration for the Savage River site and the costs of this we understand are already in the budget.

5. It is believed that it would be prudent to include the costs for a continuous programme for upgrading the electrical switchgear

Notes on Teleconference with M1, 29th May 2008

ProMet discussed the further extension to the planned mining at Savage River, the so-called Extension 5, with Tim Moran and Mick McKeown of M1 Mining.

The base logic of what ABM are proposing was explained by M1 but as M1 confirmed the ABM logic is still very much in its infancy and will have to be adapted as time goes on.

1. The main point to come out of the discussion for ProMet is that the extra resource is to be obtained form the existing North Pit and not from Long Plains or South Pit. This eliminates for all practical purposes any perceived major problems with the ability of the crushing and concentration plants to be able to efficiently handle significantly different ores.

2. Problems may still arise if the ore proves harder as the mine is deepened. ABM is aware of this problem and has contingency plans.

3. North Pit will be deepened from 180m below sea level to 257.5 m below. This will be major pit in its dimensions once the mine plan is finished.

4. The ore that had been included from other pit areas is slightly decreased in the new plan but this is not considered significant at this stage.

5. M1 advised that the outline plan they had discussed with ABM was obviously not yet optimised but can be basically considered sound despite this.

14. ABBREVIATIONS AND ACRONYMS

ABM	Australian Bulk Minerals
ABM CARES	Designation of the plant Safety Programme
LTI	Lost Time Incident
LTIFR	Lost Time Incident Frequency Rate
DNV	DNV Certification is a division of Det Norske Veritas (DNV) an independent foundation established in 1864 as a ship classification society.
DNV (ISRS)	International Safety Rating System
SWP	Safe Work Procedure
SCADA	Supervisory Control and Data Acquisition
CCS	Computer Control Software
AI	Artificial Intelligence
EBA	Employees Benefits Agreement
PM	Preventative Maintenance
DoTaRS	Department of Transport and Regional Services

APPENDIX 1

SAVAGE RIVER CONCENTRATOR PLANT – DWG NO. 32059 CONCENTRATOR FLOW SHEET

APPENDIX 2

PORT LATTA PELLETISING PLANT – DWG NO. 32057 PLANT FLOW SHEET

APPENDIX 3

SAVAGE RIVER PIPELINE ASSESSMENT

PIPELINE SYSTEM AUDIT REPORT

APPENDIX 4

TEAM CVs

APPENDIX 5

PHOTOGRAPHS

Figure 1: Mine North Pit - Working Level

Figure 2: Mine North Pit – Top of Face

Figure 3: Road Access at Bottom of Pit

Figure 4: View of Mine from Above

Figure 5: View of Pit

Figure 6: Raw Feed Conveyor

Figure 7: Crushed Ore Stockpile

Figure 8: Concentrator Control Room

Figure 9: Cyclone Bank

Figure 10: Cyclone Bank

Figure 11: Mill Building

Figure 12: AG Mill

Figure 13: AG Mill

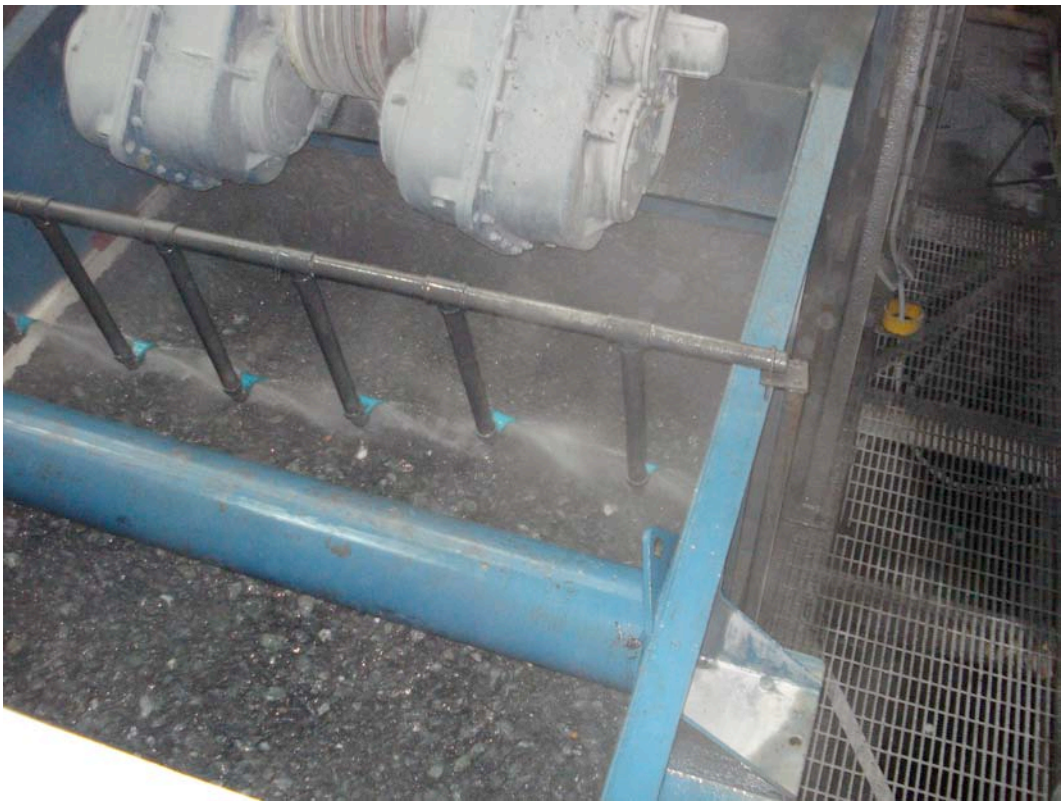

Figure 14: Mill Discharge

Figure 15: Ball Mill - Drive End

Figure 16: Ball Mill

Figure 17: Screening Station

Figure 18: Rougher Magnetic Separators

Figure 19: Pebble Crusher

Figure 20: Tailings Thickener

Figure 21: Concentrate Pipeline

Figure 22: Concentrate Pipeline

Figure 23: Concentrate Pipeline

Figure 24: Concentrate Pipeline

Figure 25: Concentrate Pipeline

Figure 26: Concentrate Pipeline

Figure 27: Concentrate Pipeline

Figure 28: Concentrate Receiver

Figure 29: Control Room - Pellet Plant / Port

Figure 30: Vacuum Filter

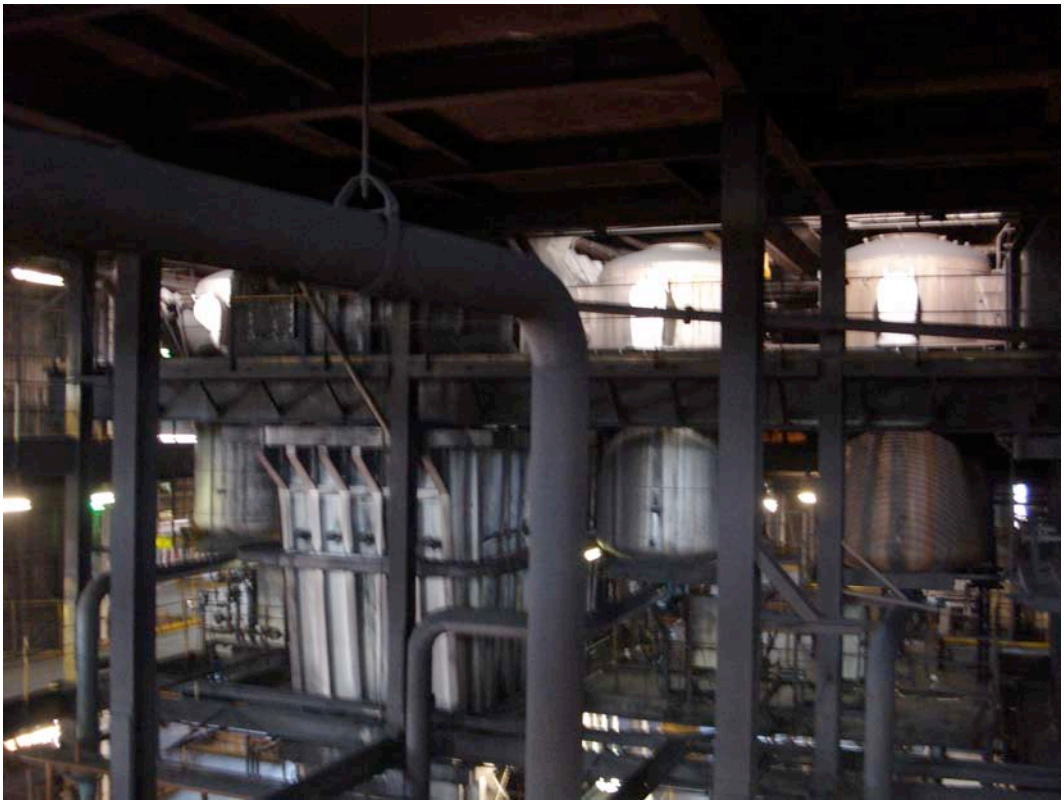

Figure 31: Pellet Kiln

Figure 32: Pellet Stacker

APPENDIX 6

DPWIE SRRP SCHEDULE (2) AND MLEP 2007 – 2022 CAPEX

SRRP Budget & Purchase Price repayments (est May 04)	2004	Actual	2005 1st Qtr	Actual	2005 2nd Qtr	Actual	2005 3rd Qtr	2005 4th Qtr	2005 Total	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	2006 Total	2007	2008	2009	
DPWIE SRRP SCHEDULE (2)																		
SRRP Cash out items (excluding admin costs)																		
CASH ITEM																		
Treatment plant	$10,000				$5,000			$5,000	$10,000		$5,000		$5,000		$10,000	$250,000	350,000	
North dump drainage works & piping							$20,000		$20,000			$500,000	$500,000	$800,000				
Pump, Roadworks & pipes OTD									$0				$50,000				380,000	
Main Creek pumping station & Dam									$0			$100,000	$100,000	$200,000	$1,000,000			
Weed control	$25,000		$5,000			$40,743		$20,000	$65,743	$10,000			$15,000	$25,000	$25,000	$25,000		
Water shedding cover B dump					$50,000	$420,432	$25,000	$25,000	$520,432					$450,000			50,000	
Seepage collection A & B Dumps					$50,000	$16,085			$66,085	$25,000	$25,000							
A dump cover							$25,000	$25,000	$50,000					$0				
North West dump									$0					$0				
Upper SW Ramp														$200,000				
SUBTOTAL	$35,000	$0	$5,000	$0	$105,000	$477,260	$70,000	$75,000	$732,260					$1,675,000	$1,035,000	$275,000	$780,000	$3,765,000
Old sub total														$1,335,000	$1,035,000	$465,000	$850,000	$3,765,000
																		NB: includes carry over from 2005
SRRP Contract payments																		
Purchase price reductions																		
Broderick Creek																		
Extension Flow through	$200,000			$218,331														
Alkalinity payments	$7,000	$11,152					$7,000		$7,000			$7,000		$7,000	$7,000	$7,000	$7,000	
42 Month targets met															$100,000			
North West dump																		
Complete drainage and dozer works																	$78,443	
South West Dump																		
2nd year revegetation	$15,000	$17,502																
Weeds																		
2003 works	$9,000	$9,000																
Final report	$10,100	$15,000							$10,100									
2004 works	$25,000	$31,317							$25,000									
2005 works										$25,000				$25,000				
2006 works															$25,000			
2007 works																$25,000		
Centralised Water Treatment																		
Water quality 2004	$25,037			$27,332														
Water quality 2005							$25,037		$25,037									
Water quality 2006											$25,037			$25,037				
Water quality 2007															$25,037			
Water quality 2008																$25,037		
Water quality 2009																	$25,037	
Crusher gully																		
2 years seepage collection			$6,844	$0	pump failure				$6,844									
Annual seepage collection fee										$10,000				$10,000	$10,000	$10,000	$10,000	
B Dump																		

Competion of mining work ontop of B dump

SRRP Budget & Purchase Price repayments (est May 04)	2004	Actual	2005 1st Qtr	Actual	2005 2nd Qtr	Actual	2005 3rd Qtr	2005 4th Qtr	2005 Total	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	2006 Total	2007	2008	2009
Submission of Water Shedding Cover Design Plan	$50,000					$51,296	delay in receiving reports										
Submission of Alkaline Cover Design Plan	$50,000					$51,646	delay in receiving reports										
Submission of Preliminary Pumping System Design Plan	$30,000							$30,000	$30,000								
Construction of water shedding cover in accordance with design														$3,500,000			
Construction of alkaline cover in accordance with design	$750,000					$774,685			$750,000								
Diversion of seepage to South Centre Pit												$200,000		$200,000			
Provision of Flow monitoring Report and review Final Pump Design Plan													$20,000	$20,000			
Construction of Pumping System in accordance with design															$2,230,000		
Commissioning of Pumping System to comply with NPV																$200,000	
Final Report																	
Treatment plant design & Construction																	
Design approved															$100,000		
Supply reagent																$100,000	
Construction completed																	$4,963,254
North Dump Drain																	
Design approval													$20,000	$20,000			
Piping & trackworks															$1,167,290		
Cut off gully																$186,592	
OTD																	
Design approval																$50,000	
Construction of Pumping System in accordance with design																	478,502
Misc	$15,000			$26,136					$15,000					$15,000	$15,000	$15,000	$528,524
SUBTOTAL	**$1,186,137**	**$83,971**	**$6,844**	**$271,799**	**$0**	**$877,627**	**$32,037**	**$30,000**	**$868,981**					**$3,822,037**	**$3,679,327**	**$618,629**	**$6,090,760**
PURCHASE PRICE REDUCTIONS (at 31 Dec each year	$13,398,173								$13,857,816					$9,805,191	$6,125,864	$5,507,235	-$583,525
assumes cpi increase in purchase price = cpi increase in contract claims each year (any difference up or down to come out of construction claim for treatment plant)							CPI Increases							402,841	347,125	309,641	- 1,059,607
																	476,081

MLEP 2007-2022 Capex

AUSTRALIAN BULK MINERALS

2007-2022 Mine Life Extension

CAPEX ITEM		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2026	2021	2022	LOM ACTUAL + FORECAST TOTAL	LOM BUDGET TOTAL	Variance
Concentrate Production																					
BURNIE																					
COMPUTING - ABM SITE WIDE																					
Desktop Replacements - Burnie		4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	2,000				**54,000**	**54,000**	**0**
Desktop Replacements - Port		6,353	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000				**84,353**	**104,353**	**20,000**
Desktop Replacements - Savage		8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	4,000	4,000	4,000				**100,000**	**100,000**	**0**
Laptops		18,681	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000				**278,681**	**140,000**	**-138,681**
Mining Information System Implementation		100,000																	**100,000**	**300,000**	**200,000**
Security Access System - All Sites			300,000																**300,000**	**0**	**-300,000**
																			0	**0**	**0**
																			0	**0**	**0**
Office Refurbishment		35,000																	**35,000**	**0**	**-35,000**
Workhorse Printers		3,459	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000				**81,459**	**43,020**	**-38,439**
Standard Laser Printers		5,115	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000				**31,115**	**43,500**	**12,385**
Portable Devices			35,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000				**275,000**	**18,719**	**-256,281**
Digital Projectors / Whiteboards		6,000	12,000	6,000	6,000	6,000	6,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000				**66,000**	**6,000**	**-60,000**
Licenses		34,740	87,500	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000				**602,240**	**294,740**	**-307,500**
Server Upgrade		33,256	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	5,000	10,000	10,000				**208,256**	**173,256**	**-35,000**
Network Hardware		18,719	25,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000				**283,719**	**85,000**	**-198,719**
Network Infrastructure		33,575	165,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000				**558,575**	**173,575**	**-385,000**
Subtotal Computing	**0**	**306,898**	**685,500**	**177,000**	**177,000**	**177,000**	**177,000**	**174,000**	**174,000**	**174,000**	**174,000**	**174,000**	**160,000**	**165,000**	**163,000**	**0**	**0**	**0**	**3,058,398**	**1,536,163**	**-1,522,235**
BURNIE TOTAL	**0**	**306,898**	**685,500**	**177,000**	**177,000**	**177,000**	**177,000**	**174,000**	**174,000**	**174,000**	**174,000**	**174,000**	**160,000**	**165,000**	**163,000**	**0**	**0**	**0**	**3,058,398**	**1,536,163**	**-1,522,235**
SAVAGE RIVER																					
MINING & GEOLOGY																					
																			0		**0**
Prestripping of Clay		5,009,675																	**5,009,675**	**24,200,203**	**19,190,528**
Cable Bolting																			**0**	**6,117,157**	**6,117,157**
Tyres		1,350,000																	**1,350,000**	**1,350,000**	**0**
In Pit Maintenance Facility - Workshop																					**0**
Workshop - Site Prep		704,653																	**704,653**	**540,000**	**-164,653**
Workshop - Fuel Access Road		500,000																	**500,000**	**0**	**-500,000**
Workshop - Site & Other		800,000	2,711,417																**3,511,417**	**0**	**-3,511,417**
Workshop - Main Switch Room & Kiosk		300,000	174,730																**474,730**	**0**	**-474,730**
Workshop - South Lens & Sewage Treatment		150,000	600,370																**750,370**	**0**	**-750,370**
Workshop - Misc In Pit Facility - Excluded from Tender			1,243,720																**1,243,720**	**0**	**-1,243,720**
Workshop - Fuel & Lubrication Equipment		1,500,000	1,767,034																**3,267,034**	**0**	**-3,267,034**
Workshop - Reliability Centre		809,255	810,426																**1,619,681**	**1,290,000**	**-329,681**
Workshop - Infrastructure		613,694	3,969,616																**4,583,310**	**3,000,000**	**-1,583,310**
Workshop -Fitout																			**0**	**1,000,000**	**1,000,000**
Workshop - Contingency			1,736,643																**1,736,643**	**0**	**-1,736,643**
Workshop - Wash Bay		300,000	412,698																**712,698**	**1,300,000**	**587,302**

Workshop - EPCM		990,000																	**990,000**	**700,000**	**-290,000**
Workshop - Power Connection		400,000																	**400,000**	**400,000**	**0**
Workshop - North Pit Crib & Office Space			1,485,744																**1,485,744**	**750,000**	**-735,744**
																			0	**0**	**0**
Dump Body							900,000		900,000										**1,800,000**	**3,600,000**	**1,800,000**
Buckets - Production Excavators		130,100			500,000		500,000		250,000										**1,380,100**	**1,160,000**	**-220,100**
O&K RH120 ex WAPL		815,000																	**815,000**	**750,080**	**-64,920**
Survey		49,040	175,000																**224,040**	**400,000**	**175,960**
Remote Controlled Excavator/Dozer		788,000																	**788,000**	**1,138,000**	**350,000**
Diamond Drilling		380,400	1,006,500	1,120,600		796,300	1,202,000												**4,505,800**	**3,916,790**	**-589,010**
Drilling Long Plains		149,254																	**149,254**	**154,000**	**4,746**
Flora & Fauna - FPP		3,050																	**3,050**	**15,537**	**12,487**
Approval Process		7,968																	**7,968**	**10,889**	**2,921**
Maintenance Equipment for ABM Maintenance		28,957	30,000	259,000	174,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000							**659,957**	**147,409**	**-512,548**
Mine Safety Fence																			**0**	**321,968**	**321,968**
Overheads		74,439																	**74,439**	**40,000**	**-34,439**
Reversing Camera Monitor System		6,300																	**6,300**		**-6,300**
Simulater - Training Equipment		871,733																	**871,733**		**-871,733**
CAT5130B Excavator		353,269																	**353,269**	**0**	**-353,269**
Eastern River Crossing		713,000																	**713,000**	**500,000**	**-213,000**
																			0	**0**	**0**
Western River Crossing Replacement		481,417	375,000																**856,417**	**500,000**	**-356,417**
Portable XRF Analyzer			130,000																**130,000**		**-130,000**
Down Hole Grade Control Sampling		30,700																	**30,700**		**-30,700**
Operation - Tools		636	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000							**180,636**		**-180,636**
Furniture - Mine				12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000							**108,000**		**-108,000**
Geology - Tools			73,500	13,500	13,000	11,500	14,000	10,000	10,000	10,000	10,000	10,000							**175,500**		**-175,500**
Explosives - Loader		250,000																	**250,000**		**-250,000**
Explosives - Infrastructure		450,000	300,000																**750,000**		**-750,000**
Three (3) Hitachi EX3600 Excavators		5,100																	**5,100**		**-5,100**
Sandvik Drill Rig		1,625																	**1,625**		**-1,625**
Sandvik Drill Rig Titon 600		3,330																	**3,330**		**-3,330**
Sandvik Drill Rig D45KS DTH Blast Rig		4,096																	**4,096**		**-4,096**
Service Truck - Drill Rigs		2,960																	**2,960**		**-2,960**
Remote Drill Rig Conversion																			**0**		**0**
789C Truck Rims																			**0**		**0**
Tyres - Trucks 789C																			**0**		**0**
Sandvik Drill Rig # 2																			**0**		**0**
D10T Dozers x 4																			**0**		**0**
																			0		**0**
																			0		**0**
																			0		**0**
Zone Maintenance - Mobile Equipment		12,845																	**12,845**		**-12,845**
Cable Bolt Drill Rig Engineering Design			300,000																**300,000**		**-300,000**
Dewatering Pump				500,000	500,000				500,000										**1,500,000**		**-1,500,000**
																			0		**0**
																			0		**0**
16H Graders x 2																			**0**		**0**
789C Dump Truck x 13		13,228																	**13,228**		**-13,228**
DT Hi Load Trays - 789C Trucks		2,839																	**2,839**		**-2,839**
st **Subtotal Mining**	**0**	**19,056,563**	**17,320,398**	**1,923,100**	**1,217,000**	**861,800**	**2,670,000**	**64,000**	**1,714,000**	**64,000**	**64,000**	**64,000**	**0**	**0**	**0**	**0**	**0**	**0**	**45,018,861**	**53,302,033**	**8,283,172**
TOWNSHIP & SECURITY																					
Refurbish Security Area			150,000	20,000															**170,000**	**20,000**	**-150,000**

Upgrade Fire Alarms/School /New Accomodation		245,231	100,000				40,000												385,231	493,341	108,110
																			0	70,000	70,000
Roofing and Other Works		86,500	78,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000								804,500	806,000	1,500
Asbestos Pump																			0	12,000	12,000
Boomgate Replacement																			0	9,000	9,000
Lodge & Kitchen Replacements		3,896		10,000		10,000		10,000		10,000		10,000		10,000					63,896	3,896	-60,000
																			0	0	0
Mess & Kitchen Upgrade		55,476	600,000																655,476	560,000	-95,476
Accommodation Upgrade		1,124,660	2,160,000	340,000															3,624,660	1,567,560	-2,057,100
ST **Subtotal Township & Security**	**0**	**1,515,763**	**3,088,000**	**450,000**	**80,000**	**90,000**	**120,000**	**90,000**	**80,000**	**90,000**	**80,000**	**10,000**	**0**	**10,000**	**0**	**0**	**0**	**0**	**5,703,763**	**3,541,797**	**-2,161,966**
WAREHOUSE & STORES																					
CCTV Systems - Stores			50,000																50,000	15,000	-35,000
Roof & Walls Refurbishment					50,000		50,000				50,000								150,000	150,000	0
T30 Diesel Fuel Tank Pod - Autofill Security Control			80,000																80,000	0	-80,000
Boilermaker/Stores Workshop Refurbishment				135,000															135,000	0	-135,000
Fire Protection for insurance spares				200,000															200,000	100,000	-100,000
New Goods Recieval Area																			0	0	0
ST **Subtotal Warehouse & Stores**	**0**	**0**	**130,000**	**335,000**	**50,000**	**0**	**50,000**	**0**	**0**	**0**	**50,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**615,000**	**265,000**	**-350,000**
Environmental - Savage River	75																				
Tailings Dam		671,000	293,000		4,265,000					2,550,000									7,779,000	7,630,427	-148,573
Replace monitoring equipment																			0	250,000	250,000
ETD							100,000											250,000	350,000	350,000	0
In Pit Maintenance Facility Removal																		2,000,000	2,000,000	250,000	-1,750,000
Broderick Creek - Rehabilitation			30,000										150,000						180,000	150,000	-30,000
North Pit - Rehabilitation													50,000	50,000					100,000	100,000	0
MCTD - Rehabilitation															500,000				500,000	500,000	0
Revegetation													125,000	125,000	250,000			250,000	750,000	750,000	0
Miscellaneous - Rehabilitation															250,000			250,000	500,000	500,000	0
Raise Corinna Rd		793,400																	793,400	600,000	-193,400
Upper ROM																		50,000	50,000	50,000	0
Concentrator																		500,000	500,000	500,000	0
Town																		500,000	500,000	500,000	0
North Pit																		200,000	200,000	200,000	0
Pipeline road																		350,000	350,000	350,000	0
Decline / plugs																			0	0	0
SR Building & Concrete Removal																		4,000,000	4,000,000	4,000,000	0
Concentrator Removal																		1,500,000	1,500,000	1,500,000	0
5 Year Sampling / Maintenance Contract																		500,000	500,000	500,000	0
Disposal Radiation Gauges																		65,000	65,000	65,000	0
South Dump Rehabilitation		86,000																	86,000	75,000	-11,000
South Deposit drainage works		30,000																	30,000	30,000	0
Centre Pit Windrows & Signage		50,000																	50,000	50,000	0
South Lens Windrows & Signage																		50,000	50,000	50,000	0
North Pit Windrows & Signage			50,000																50,000	50,000	0
																			0	0	0
ST **Subtotal Environmental - Savage River**	**0**	**1,630,400**	**373,000**	**0**	**4,265,000**	**0**	**100,000**	**0**	**0**	**2,550,000**	**0**	**0**	**325,000**	**175,000**	**1,000,000**	**0**	**0**	**10,465,000**	**20,883,400**	**19,000,427**	**-1,882,973**
CONCENTRATOR																					

GC1 - Primary Crusher:-																			**0**	**0**	**0**
Structural Refurbishment - GC1			50,000	50,000		50,000		50,000		50,000		50,000							**300,000**	**358,000**	**58,000**
Civil Foundation Approach Ramp Upgrade			100,000			80,000			80,000			80,000			80,000				**420,000**	**240,000**	**-180,000**
																			0	**0**	**0**
GC2 - South Pit Crusher																			**0**	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
AF1 - Primary apron Feeder																			**0**	**0**	**0**
Hagglunds Drive				300,000															**300,000**	**0**	**-300,000**
Structural Refurbishment - AF1			50,000	50,000		50,000		50,000		50,000		50,000							**300,000**	**358,000**	**58,000**
																			0	**0**	**0**
AF2 & 3 - Stockpile Feeder																			**0**	**0**	**0**
Line 4 Sump Pump																			**0**	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
BC1 - Pit Conveyor:-																			**0**	**0**	**0**
Replace CST's & install VSD					1,400,000														**1,400,000**	**1,250,000**	**-150,000**
Structural Upgrade - BC1		330,000	200,000																**530,000**	**0**	**-530,000**
Structural Refurbishment - BC1			50,000		50,000		50,000		50,000		50,000								**250,000**	**504,000**	**254,000**
																			0	**0**	**0**
																			0	**0**	**0**
BC2 - Stacker Conveyor:-																			**0**	**0**	**0**
Structural Refurbishment - BC2		18,000	60,000		300,000		50,000		50,000		50,000								**528,000**	**528,000**	**0**
BC - 1 Drive Weather Protection (CST1&2)		440																	**440**	**2,050**	**1,610**
BC - 1 Belt Repair Station			50,000																**50,000**	**15,000**	**-35,000**
Luff Cables/Link Rods					75,000														**75,000**	**75,000**	**0**
																			0	**0**	**0**
PC2 & 3 Pebble Crushers:-																			**0**	**0**	**0**
Soft Starters																			**0**	**0**	**0**
H6000 Replacement																			**0**	**0**	**0**
Screening crusher Feed																			**0**	**0**	**0**
Structural Refurbishment - PC1&2			50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000							**500,000**	**504,000**	**4,000**
																			0	**0**	**0**
Conveyors General:-																			**0**	**0**	**0**
GTU BC 7 & 8 & Weigh Scales																			**0**	**50,000**	**50,000**
Weightometers bc 15																			**0**	**25,000**	**25,000**
Structural Refurbishment - Conveyors				50,000		50,000		50,000		50,000		50,000							**250,000**	**300,000**	**50,000**
																			0	**0**	**0**
Piping General:-																			**0**	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**
																			0	**0**	**0**

																			0	0	0
AM1 & 2 - Autogenous Mills :-																			0	0	0
AM 2nd Girth Gear Purchase x 1						540,000													540,000	365,000	-175,000
Shell / Feed Ends Drill Hole Refurbishment																			0	0	0
AM2 DE Trunnion							525,000												525,000	450,000	-75,000
Bearing Sets				100,000															100,000	100,000	0
Upgrade Lube x2 + Watchdog				150,000															150,000	150,000	0
Rheostat -Wall & Roof Protect'n																			0	0	0
Line 1 Mill Refurbishment		735,297																	735,297	928,717	193,420
Line 2 Mill Refurbishment		202,588																	202,588	378,390	175,802
2nd Inching drive			130,000																130,000	130,000	0
Fire Loss - Legal Fees		295,745																	295,745	255,173	-40,572
Fire Loss - Loss Adjusters		39,030																	39,030	32,288	-6,742
Install Gear, Trunnion, Pinion								500,000											500,000	500,000	0
Spare Mill Motor		2,100,000	400,000		1,700,000	800,000													5,000,000	4,400,000	-600,000
New Shells & Ends for AM1 &AM2		222,500	1,200,000	3,600,000	2,400,000	500,000	500,000												8,422,500	4,000,000	-4,422,500
BM1 & 2 - Ball Mills:-																			0	0	0
BM 2nd Girth Gear Purchase x 1						540,000													540,000	365,000	-175,000
Upgrade Lube x2 +watchdog				290,000															290,000	290,000	0
Inching Drives & Eng			400,000																400,000	260,000	-140,000
Install Girth Gear																			0	0	0
Purchase BM Shell & Install					500,000														500,000	350,000	-150,000
Support Structures Refurbishment																			0	0	0
Spare Mill Motor - BM 1 & 2			500,000		500,000														1,000,000	750,000	-250,000
																			0	0	0
Pumps - General:-																			0	0	0
Replace SP1-SP6 & VSD's				1,000,000															1,000,000	1,000,000	0
Additional pipeline Pump(VSD)				800,000															800,000	800,000	0
Pipeline Station Spares																			0	0	0
Replace SP7 with 10/8 Warman																			0	0	0
Savage River Emergency Water Pumps		60,000																	60,000	0	-60,000
																			0	0	0
Concentrator & Workshop General Items																			0	0	0
Roofing Replacements			130,000	150,000		50,000		50,000											380,000	380,000	0
Ventilation Top Floor Building																			0	0	0
Sec Finisher Scrn upgrade																			0	0	0
Instrument Air Dryer Replace																			0	0	0
Fitters Pipeline Workshop Replacement			50,000																50,000	15,000	-35,000
Refurbish / Replace Pipeline Control Room		949																	949	1,144	195
Replacement Raw Water Filtration System				200,000															200,000	200,000	0
Fire System Upgrade - Conc		100,000	700,000																800,000	350,000	-450,000
Plant Air Compressor Replacement		161,878																	161,878	0	-161,878
SP9&10 Concentrate Duplication Line		94,999																	94,999	0	-94,999
General Structural Refurbishment - Including Workshops		200,997	96,000	100,000	100,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000							846,997	742,988	-104,009
New Finisher Mag Separators								1,400,000											1,400,000	432,000	-968,000
Rougher Mags Refurbishment x 5 units								600,000											600,000	0	-600,000
Tools		16,956	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000						148,956	119,056	-29,900
Conc - Furniture General		7,058	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000						139,058	7,058	-132,000
Tails Pumps & Tails Dam:-																			0	0	0
Pump Station Upgrade					1,500,000														1,500,000	50,000	-1,450,000
Monorail Pump Station																			0	20,000	20,000
2nd Pumpset & Controls																			0	475,000	475,000
Tailings Lines																			0	500,000	500,000
Upgrade Raw Water Filters																			0	0	0
Relocate O/F & Reclaim Water																			0	0	0
																			0	0	0

HazChem Store:-																			**0**	**0**	**0**
New Shed-Scav & Flocculant																			**0**	**0**	**0**
																			0	**0**	**0**
Workshop & Mobile Equip																			**0**	**0**	**0**
Waste Oil/Storage Pad																			**0**	**0**	**0**
Vehicle Cleaning Station																			**0**	**0**	**0**
Vehicles																			**0**	**0**	**0**
Mobile Compressor			130,000																**130,000**	**70,000**	**-60,000**
Forklifts					60,000														**60,000**	**50,000**	**-10,000**
Hiab truck																			**0**	**30,000**	**30,000**
Finisher Crane Structural Refurbishment																			**0**	**0**	**0**
IT Carrier																			**0**	**0**	**0**
Workshop Ext inc paint & sand			250,000																**250,000**	**250,000**	**0**
blast shed & forklift cover																			**0**	**0**	**0**
New Lathe				60,000															**60,000**	**20,000**	**-40,000**
Power Hacksaw																			**0**	**0**	**0**
Instrument Workshop Refurb			280,000																**280,000**	**280,000**	**0**
New Light Vehicle Hoist		13,700																	**13,700**	**0**	**-13,700**
Lab/Instruments/Controls																			**0**	**0**	**0**
PSM (Particle Size Monitor)			150,000																**150,000**	**0**	**-150,000**
Lab Mag Separator																			**0**	**50,000**	**50,000**
																			0	**0**	**0**
Occ Health & Safety :-																			**0**	**0**	**0**
ERT Equipment																			**0**	**0**	**0**
Fire Equipment:-																			**0**	**0**	**0**
Special PPE																			**0**	**0**	**0**
st **Subtotal Concentrator**	**0**	**4,600,137**	**5,050,000**	**6,974,000**	**8,659,000**	**2,784,000**	**1,249,000**	**2,824,000**	**304,000**	**274,000**	**224,000**	**354,000**	**24,000**	**0**	**80,000**	**0**	**0**	**0**	**33,400,137**	**23,755,864**	**-9,644,273**

ELECTRICAL

Electrical Upgrades			50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000									**400,000**	**490,000**	**90,000**
2x Transformers - Main				800,000															**800,000**	**800,000**	**0**
Electrical Upgrades/Controls		85,000																	**85,000**	**85,000**	**0**
Slip Energy Systems																			**0**	**0**	**0**
Structural Refurbishment including																			**0**	**0**	**0**
cable trays, supports, modules,																			**0**	**0**	**0**
MCC & Subs Refurbishment			30,000			30,000		30,000		30,000		30,000							**150,000**	**150,000**	**0**
cable supports, etc																			**0**	**0**	**0**
st **Subtotal Electrical**	**0**	**85,000**	**80,000**	**850,000**	**50,000**	**80,000**	**50,000**	**80,000**	**50,000**	**80,000**	**0**	**30,000**	**0**	**0**	**0**	**0**	**0**	**0**	**1,435,000**	**1,525,000**	**90,000**

INFRASTRUCTURE

Conc Storage Repairs/Paint					100,000														**100,000**	**100,000**	**0**
Conc Thickeners Repairs/Paint					100,000														**100,000**	**100,000**	**0**
Hydroseparator Repairs/Paint					100,000														**100,000**	**100,000**	**0**
Tails Thickener Repairs/Paint				400,000															**400,000**	**400,000**	**0**
Mill Head Tank Repair/Replace							750,000												**750,000**	**500,000**	**-250,000**
Feed Tank Pipeline Renew					250,000														**250,000**	**150,000**	**-100,000**
st **Subtotal Infrastructure**	**0**	**0**	**0**	**400,000**	**550,000**	**0**	**750,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,700,000**	**1,350,000**	**-350,000**

CONTROL SYSTEM

Control System Automation SR		25,000	230,000	50,000															**305,000**	**250,000**	**-55,000**

																				0	0	0
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st	**Subtotal Control System**	**0**	**25,000**	**230,000**	**50,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**305,000**	**250,000**	**-55,000**
ST	**CONCENTRATOR SUB-TOTAL**	**0**	**4,710,137**	**5,360,000**	**8,274,000**	**9,259,000**	**2,864,000**	**2,049,000**	**2,904,000**	**354,000**	**354,000**	**224,000**	**384,000**	**24,000**	**0**	**80,000**	**0**	**0**	**0**	**36,840,137**	**26,880,864**	**-9,959,273**
ST	**SAVAGE RIVER TOTAL**	**0**	**26,912,863**	**26,271,398**	**10,982,100**	**14,871,000**	**3,815,800**	**4,989,000**	**3,058,000**	**2,148,000**	**3,058,000**	**418,000**	**458,000**	**349,000**	**185,000**	**1,080,000**	**0**	**0**	**10,465,000**	**109,061,161**	**102,990,121**	**-6,071,040**

PORT LATTA

TANK FARM

Upgrade Reclaim System																			**0**	**0**	**0**
Install concrete pad under filter cake stockpile																			**0**	**0**	**0**
108-1 Tank Corrosion protect																			**0**	**0**	**0**
108-2 Tank Corrosion protect																			**0**	**0**	**0**
P0801 Tank Replacement				500,000															**500,000**	**300,000**	**-200,000**
P117 Replace Tank				100,000															**100,000**	**30,000**	**-70,000**
P118 Millwater Pumps increase capac'y																			**0**	**0**	**0**
P14 Structural upgrade																			**0**	**0**	**0**
P15 Vacuum Pumps Replace quieter units (Nash)						200,000	200,000	200,000											**600,000**	**600,000**	**0**
P21 Concrete wall upgrade			100,000																**100,000**	**0**	**-100,000**
P3 Tank Corrosion protect																			**0**	**0**	**0**
P3 Rake&Tube replacement																			**0**	**0**	**0**
P8-2 Tank Corrosion protect																			**0**	**0**	**0**
P8-3 Tank Corrosion protect																			**0**	**0**	**0**
																			0	**0**	**0**
008-4 Tank Corrosion protect																			**0**	**0**	**0**
Install pipework -reclaim feed direct to thickeners																			**0**	**0**	**0**
Structural Upgrades/Handrails																			**0**	**0**	**0**
Fencing, barriers & Guarding																			**0**	**0**	**0**

																			0	0	0
																			0	0	0
																			0	0	0
Renew tankfarm basin water piping			100,000																100,000	100,000	0
Replace top floor density meter							10,000												10,000	10,000	0
																			0	0	0
																			0	0	0
																			0	0	0
st **Subtotal Tank Farm**	**0**	**0**	**200,000**	**600,000**	**0**	**200,000**	**210,000**	**200,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,410,000**	**1,040,000**	**-370,000**

BALLING

P19 Structural upgrade																			0	0	0
P23 Dust Collection install																			0	0	0
P23 platform&access upgrade																			0	0	0
P32 takeup platform replace																			0	0	0
P41 girth gears eng/ assess							100,000	100,000	100,000	100,000									400,000	400,000	0
																			0	0	0
Balling Walkways Upgrade																			0	0	0
P41 Motor replacement -VSD																			0	0	0
Filter Bag Change System																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
Upgrade lube system on Balling drums																			0	40,000	40,000
st **Subtotal Balling**	**0**	**0**	**0**	**0**	**0**	**0**	**100,000**	**100,000**	**100,000**	**100,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**400,000**	**440,000**	**40,000**

INDURATION

																			0	0	0
P54 Blowers Motors replace			180,000																180,000	0	-180,000
Structural/H/Rails,Gaurds etc																			0	0	0
Structural Refurb - Top Floor Cribroom / Roof																			0	0	0
M/Blower Replace & Vib Monit					400,000	400,000													800,000	1,600,000	800,000
Relocate Blower Intakes																			0	0	0
																			0	100,000	100,000
																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
st **Subtotal Induration**	**0**	**0**	**180,000**	**0**	**400,000**	**400,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**980,000**	**1,700,000**	**720,000**

STACKING

																			0	0	0
Stacker remote control																			0	0	0
Stacker Dust Control Eng & Construction																			0	0	0
S/Hand Jaw Crusher for HPS																			0	0	0
oversize cluster crushing																			0	0	0
068-01/536-01conv scrubber system upgrade																			0	0	0

Install upgraded 155 recyle system to take fines etc																			0	0	0
																			0	0	0
																			0	0	0
Upgrade stacker deluge pump and motor																			0	10,000	10,000
Install Stacker reclaim water system																			0	20,000	20,000
st **Subtotal Stacking**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**30,000**	**30,000**

SHIPLOADING

BC35 Headchute upgrade																			0	0	0
BC35 replace stringers																			0	0	0
																			0	0	0
BC37 Head Chute replace																			0	0	0
BC37 Replace Sampler																			0	0	0
																			0	0	0
																			0	0	0
BC39 Luff Rope Replacement																			0	0	0
Reclaimer Structural Refurb																			0	300,000	300,000
BW30/31 Bridge Extension																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
Cathodic Protection																			0	0	0
																			0	0	0
Cathodic Protection																			0	0	0
BC35 Transfer Tower dust suppression																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
Shiploader cab upgrade			60,000																60,000	60,000	0
																			0	0	0
																			0	0	0
																			0	0	0
st **Subtotal Shiploading**	**0**	**0**	**60,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60,000**	**360,000**	**300,000**

MARINE

																			0	0	0
Marine Oil Spill Booms		50,000	50,000																100,000	50,000	-50,000
Marine Building Repairs																			0	40,000	40,000
Dolphins, Chains & Bouys		30,717			31,000			31,000			31,000			31,000					154,717	130,000	-24,717
Line Boats/Barge Refurbishment			40,000	75,000	40,000		40,000		40,000		40,000		40,000						315,000	305,000	-10,000
st **Subtotal Marine**	**0**	**80,717**	**90,000**	**75,000**	**71,000**	**0**	**40,000**	**31,000**	**40,000**	**0**	**71,000**	**0**	**40,000**	**31,000**	**0**	**0**	**0**	**0**	**569,717**	**525,000**	**-44,717**

BENTONITE

Mill replacement assess life																			0	400,000	400,000
																			0	0	0
Transp'r Compressor Upgrade																			0	0	0
Building repairs,cladding etc																			0	0	0
Struct repairs,h/rails plat etc																			0	0	0

st																						
	Subtotal Bentonite	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**400,000**	**400,000**
	SITE SERVICES																					
	Armco Barriers Various																			**0**	**0**	**0**
	H/rails, ladders,W/ways to AS																			**0**	**0**	**0**
	Mobile Compressor Replacement		49,000																	**49,000**	**0**	**-49,000**
	Screened Pellet Bypass Chute		25,000	50,000																**75,000**	**0**	**-75,000**
	Washdown/Steam Clean Pad																			**0**	**0**	**0**
	Replac Safety Lines plant roof																			**0**	**0**	**0**
	Renew South Roof of plant			50,000	300,000															**350,000**	**300,000**	**-50,000**
	Plant Structurals,doors,beams																			**0**	**0**	**0**
	Compression Tester			175,000																**175,000**	**0**	**-175,000**
	Moisture Analyzer			500,000																**500,000**	**0**	**-500,000**
	Transfer Conveyor Roof Replacement																			**0**	**0**	**0**
	Repairs to Admin area roads																			**0**	**0**	**0**
	Refurb of Admin Offices/Reloc																			**0**	**0**	**0**
	Admin Build external cladding						100,000		100,000											**200,000**	**200,000**	**0**
	Main plant air Compressors x2 replacement			100,000		100,000														**200,000**	**750,000**	**550,000**
	New Fire Pump-Diesel																			**0**	**0**	**0**
	Offshore Structural Steel Refurb		307,511	90,000	75,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000						**922,511**	**1,567,968**	**645,457**
	Onshore Structural Steel Refurb		105,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000						**655,000**	**1,107,957**	**452,957**
	Spare Parts - LTV Plant USA from Demolition		4,113	95,000																**99,113**	**100,000**	**887**
	Flocculant Dosing Pump		3,233																	**3,233**	**5,000**	**1,767**
	Control Room Air Condionter Replacement																			**0**	**10,000**	**10,000**
	Microscope		8,363																	**8,363**	**10,000**	**1,637**
																				0	**0**	**0**

st																						
	Subtotal Site Services	**0**	**502,220**	**1,110,000**	**425,000**	**200,000**	**200,000**	**100,000**	**200,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**0**	**0**	**0**	**0**	**0**	**3,237,220**	**4,050,925**	**813,705**
	ELECTRICAL																					
	Electrical Upgrades - PL			50,000		50,000		50,000		50,000										**200,000**	**384,000**	**184,000**
	New Main Nth Transformer									350,000										**350,000**	**350,000**	**0**
	New Emergency Generator				200,000															**200,000**	**200,000**	**0**
	Tools - PL		6,496	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000						**138,496**	**6,466**	**-132,030**
	PL Furniture General		7,516	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000						**139,516**	**7,516**	**-132,000**
st	**Subtotal Electrical**	**0**	**14,012**	**74,000**	**224,000**	**74,000**	**24,000**	**74,000**	**24,000**	**424,000**	**24,000**	**24,000**	**24,000**	**24,000**	**0**	**0**	**0**	**0**	**0**	**1,028,012**	**947,982**	**-80,030**
	CONTROL SYSTEM																					
	Control System Automation PL		74,000	101,000	50,000															**225,000**	**250,000**	**25,000**
	Soda Ash System Control																			**0**	**0**	**0**
	P21 - Conc Conveyor Scale																			**0**	**0**	**0**
	Automate Stacker Operation																			**0**	**0**	**0**
	Citec for Offshore Systems																			**0**	**0**	**0**
	Sub Stations to Citec																			**0**	**0**	**0**
	Fce Discharge Sampling																			**0**	**0**	**0**
	Top Gas Scrubbing in new Stack																			**0**	**0**	**0**
	Automate Thickener Ops x 3																			**0**	**0**	**0**
	Automate WTP																			**0**	**0**	**0**
	Additional Cameras - to be determined for site																			**0**	**0**	**0**
	Fce Bed Control																			**0**	**0**	**0**
	Upgrade furnace bed level control																			**0**	**0**	**0**
	Install furnace bed camera to assist control																			**0**	**0**	**0**

139-00 Conveyor auto ploughs																			0	0	0
Tank Farm Valve Automation - all pumps																			0	0	0
Level sensors on tanks																			0	0	0
Instal Flowmetres - all slurry &																			0	0	0
mill water lines & Plant and Inst air where applicable																			0	0	0
Install chunkbreaker shaft cooling water flow indicator																			0	0	0
Instal DP measurement- all slurry &																			0	0	0
water lines & air where applicable																			0	0	0
																			0	0	0
Fully automate Bentonite Systems																			0	0	0
																			0	0	0
All other equipment to be instrumented																			0	0	0
and fully automated																			0	0	0
																			0	0	0
VSD's on required equipment - to be																			0	0	0
determined. 014-01 filter feed conv																			0	0	0
																			0	0	0
Slip Energy Recovery Systems on																			0	0	0
Higher Voltage motors																			0	0	0
Install telemetery system to control room and both reclaimers for scale and heat probe																			0	0	0
																			0	0	0
Extend Citect system to reclaimer and shiploading system																			0	0	0
Automatic bead manufacturer for XRF																			0	0	0
st **Subtotal Control System**	**0**	**74,000**	**101,000**	**50,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**225,000**	**250,000**	**25,000**

Environmental - Port Latta

																			0	0	0
70m Stack				50,000	2,500,000	1,000,000													3,550,000	3,550,000	0
Dust control on Stacker				457,000															457,000	457,000	0
Centralise Stormwater				50,000															50,000	50,000	0
Jetty Runoff					50,000	150,000	150,000												350,000	350,000	0
Road Works						50,000	50,000												100,000	100,000	0
Sound Level Assessment							25,000												25,000	25,000	0
Noise modelling								35,000											35,000	35,000	0
Silencers on 95 Hz noise source - non furnace									250,000										250,000	250,000	0
Silencers on 191 Hz noise source - furnace fans									250,000										250,000	250,000	0
Silencer on F1 blower intake									250,000										250,000	250,000	0
Jetty Removal																		6,496,859	6,496,859	6,496,859	0
PL Building & Concrete Removal																		4,000,000	4,000,000	4,000,000	0
Revegetation - PL																		350,000	350,000	350,000	0
Miscellaneous																		1,200,000	1,200,000	1,200,000	0
Pipeline Demolition																		350,000	350,000	350,000	0
Disposal Radiation Gauges - PL																		65,000	65,000	65,000	0
																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
ST **Subtotal Environmental - Port Latta**	**0**	**0**	**0**	**557,000**	**2,550,000**	**1,200,000**	**225,000**	**35,000**	**750,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**12,461,859**	**17,778,859**	**17,778,859**	**0**

st **PORT LATTA TOTAL**	**0**	**670,949**	**1,815,000**	**1,931,000**	**3,295,000**	**2,024,000**	**749,000**	**590,000**	**1,414,000**	**224,000**	**195,000**	**124,000**	**164,000**	**31,000**	**0**	**0**	**0**	**12,461,859**	**25,688,808**	**27,522,766**	**1,833,958**

ENGINEERING & PROJECTS

SAVAGE RIVER

																		0	0	0
AM Liner Handler			400,000	900,000														1,300,000	750,000	-550,000
Fire System Refurb - SR																		0	0	0
River Pumps Eng																		0	0	0
Subtotal Savage River	**0**	**0**	**400,000**	**900,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,300,000**	**750,000**	**-550,000**

st

PORT LATTA

																		0	0	0
Eng Fce Controls / air / blow																		0	0	0
Sewage Plant Refurbishment				130,000														130,000	300,000	170,000
Fire System Refurb - PL					750,000													750,000	500,000	-250,000
Subtotal Port Latta	**0**	**0**	**0**	**130,000**	**750,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**880,000**	**800,000**	**-80,000**

st

GENERAL & PIPELINE

Pipeline & Internal & CP Inspections			65,000		65,000		65,000		65,000		65,000		65,000					390,000	390,000	0
Pipeline Refurbishment & Inspection		133,342	100,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000			833,342	1,473,200	639,858
ABM Expansion Options Study		235,000																235,000	0	-235,000
Personal Noise Dosemeter		8,852																8,852	0	-8,852
																		0	0	0
																		0	0	0
																		0	0	0
Design Replace Arthur Riiver & Other Crossings		125,000	398,000															523,000	0	-523,000
River Spans , Gates, Locks & Crossovers		276,261	240,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000			1,116,261	1,010,000	-106,261
Sound Meter		6,332																6,332	0	-6,332
Replacement Vehicles - All Sites		163,000	450,000	200,000	100,000	200,000	100,000		225,000		250,000							1,688,000	1,938,000	250,000
Emergency Response Trailers x 2		20,000	60,000															80,000	0	-80,000
Subtotal General & Pipeline	**0**	**967,787**	**1,313,000**	**300,000**	**265,000**	**300,000**	**265,000**	**100,000**	**390,000**	**100,000**	**415,000**	**100,000**	**165,000**	**100,000**	**100,000**	**0**	**0**	**4,880,787**	**4,811,200**	**-69,587**

st

MAJOR PROJECTS

No 1 Furnace 15y Refurb - Including Combustion Chambers												3,150,000						3,150,000	3,150,000	0
No 2 Furnace 15y Refurb - Including Combustion Chambers										3,150,000								3,150,000	3,150,000	0
No 3 Furnace 15y Refurb - Including Combustion Chambers									3,150,000									3,150,000	3,150,000	0
No 4 Furnace 15y Refurb - Including Combustion Chambers							4,650,000											4,650,000	4,650,000	0
No 5 Furnace 15y Refurb - Including Combustion Chambers								3,150,000										3,150,000	3,150,000	0
Capital Payment - Grader # 1		99,556					179,200											278,756	0	-278,756
Capital Payment - Grader # 2		99,556					179,200											278,756	0	-278,756
Capital Payment - Dozer # 1		123,611					222,500											346,111	0	-346,111
Capital Payment - Dozer # 2		123,611					222,500											346,111	0	-346,111
Capital Payment - Dozer # 3		122,222					220,000											342,222	0	-342,222
Capital Payment - Dozer # 4		122,222					220,000											342,222	0	-342,222
Capital Payment - Watercart		100,000					180,000											280,000	0	-280,000
Capital Payment - Drill Rig # 1		99,225					178,605											277,830	0	-277,830
Capital Payment - Drill Rig # 2		99,225					178,605											277,830	0	-277,830
Capital Payment - Drill Rig # 3		174,000					313,200											487,200	0	-487,200
Capital Payment - Drill Rig # 4			174,000					313,200										487,200	0	-487,200

Capital Payment - Plantman Service Truck		60,500					108,900												169,400	0	-169,400
Capital Payment - Hitachi EX3600 Excavator # 1			524,581				944,246												1,468,827	0	-1,468,827
Capital Payment - Hitachi EX3600 Excavator # 2			524,581				944,246												1,468,827	0	-1,468,827
Capital Payment - Hitachi EX3600 Excavator # 3			528,500					951,301											1,479,801	0	-1,479,801
Capital Payment - 789C Truck # 1			294,685				530,433												825,118	0	-825,118
Capital Payment - 789C Truck # 2			294,685				530,433												825,118	0	-825,118
Capital Payment - 789C Truck # 3			294,685				530,433												825,118	0	-825,118
Capital Payment - 789C Truck # 4			294,685				530,433												825,118	0	-825,118
Capital Payment - 789C Truck # 5			294,685				530,433												825,118	0	-825,118
Capital Payment - 789C Truck # 6			294,685				530,433												825,118	0	-825,118
Capital Payment - 789C Truck # 7			294,685				530,433												825,118	0	-825,118
Capital Payment - 789C Truck # 8			294,685				530,433												825,118	0	-825,118
Capital Payment - 789C Truck # 9			294,685				530,433												825,118	0	-825,118
Capital Payment - 789C Truck # 10			294,685					530,433											825,118	0	-825,118
Capital Payment - 789C Truck # 11			294,685					530,433											825,118	0	-825,118
Capital Payment - 789C Truck # 12			294,685					530,433											825,118	0	-825,118
Capital Payment - 789C Truck # 13			293,685					528,633											822,318	0	-822,318
Capital Payment - 789C Truck # 14					294,685					530,433									825,118	0	-825,118
Capital Payment - 789C Truck # 15					294,685					530,433									825,118	0	-825,118
Capital Payment - 992G Wheel Loader					214,500					307,618									522,118	0	-522,118
Capital Payment - 854G Wheel Loader					214,500					307,618									522,118	0	-522,118
Capital Payment - 777D Truck # 1		129,050					232,290												361,340	0	-361,340
Capital Payment - 777D Truck # 2		134,048					241,286												375,334	0	-375,334
Capital Payment - 777D Truck # 3		134,050					241,290												375,340	0	-375,340
Capital Payment - Hitachi EX1900 Excavator					214,456				386,021										600,477	0	-600,477
Capital Payment - Cable Bolting Machine				160,000				288,000											448,000	0	-448,000
Capital Payment - 785C Truck # 1								204,800				368,640							573,440	0	-573,440
Capital Payment - 785C Truck # 2								204,800				368,640							573,440	0	-573,440
																			0	0	0
																			0	0	0
																			0	0	0
																			0	0	0
Relocate Pipeline at SR End & Capex on the 85km line					5,300,000	1,800,000													7,100,000	4,900,000	-2,200,000
Capacity Increase - SR Pebble Mill																			0	0	0
Minproc Study - Capital Requirements for Process Plant SR					3,250,000			1,200,000											4,450,000	5,200,000	750,000
Minproc Study - Capital Requirements for Process Plant PL								1,910,000											1,910,000	6,610,000	4,700,000
Minproc Study - Capital Requirements for Process Plants Direct Costs(Capital Spares, Cranes etc)																			0	0	0
Minproc Study - Capital Requirements for Process Plant ENV (New Top & Bottom Gas Scrubbers)				500,000	1,500,000														2,000,000	2,000,000	0
Minproc Study - Accuracy Provision for Above Capital																			0	0	0
Minproc Study - EPCM Costs					800,000														800,000	800,000	0
Minproc Study - +/- 30% Contigency on Minproc Costs Only																			0	0	0
Fired pellet System inc Vertical Conv																			0	0	0
Scrubber on Stacker					500,000														500,000	500,000	0
Minproc Study Communications PL & SR																			0	0	0
Feasibility Study Funding - ABM																			0	0	0
2006 Capex Expenditure		5,926																	5,926	0	-5,926
st **Subtotal Major Projects**	**0**	**1,626,802**	**5,581,566**	**660,000**	**12,582,826**	**1,800,000**	**14,229,963**	**10,342,032**	**3,536,021**	**4,826,102**	**0**	**3,887,280**	**0**	**0**	**0**	**0**	**0**	**0**	**59,072,591**	**37,260,000**	**-21,812,591**
st **ENGINEERING TOTAL**	**0**	**2,594,589**	**7,294,566**	**1,990,000**	**13,597,826**	**2,100,000**	**14,494,963**	**10,442,032**	**3,926,021**	**4,926,102**	**415,000**	**3,987,280**	**165,000**	**100,000**	**100,000**	**0**	**0**	**0**	**66,133,378**	**43,621,200**	**-22,512,178**
TOTAL MLEP 2007 - 2022 CAPEX	**0**	**30,485,299**	**36,066,464**	**15,080,100**	**31,940,826**	**8,116,800**	**20,409,963**	**14,264,032**	**7,662,021**	**8,382,102**	**1,202,000**	**4,743,280**	**838,000**	**481,000**	**1,343,000**	**0**	**0**	**22,926,859**	**203,941,745**	**175,670,250**	**-28,271,495**

		30,485,299	36,066,464	15,080,100	31,940,826	8,116,800	20,409,963	14,264,032	7,662,021	8,382,102	1,202,000	4,743,280	838,000	481,000	1,343,000	0	22,926,859	203,941,745	175,670,250	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL FEASIBILITY MLE 2007 - 2021 CAPEX	**0**	**27,221,213**	**10,549,594**	**15,314,320**	**32,639,865**	**11,465,656**	**12,202,860**	**15,092,900**	**8,660,030**	**8,612,280**	**6,190,280**	**3,655,997**	**1,343,096**	**542,200**	**1,303,100**	**0**	**20,876,859**	**0**	**175,670,250**	
Variance		-3,264,086	-25,516,870	234,220	699,039	3,348,856	-8,207,103	828,868	998,009	230,178	4,988,280	-1,087,283	505,096	61,200	-39,900	0	20,876,859	-22,926,859	-28,271,495	
Equipment Financed - Non Cash																				
789C Dump Trucks x 13		25,408,435																**25,408,435**	**47,528,221**	**22,119,786**
Truck Trays		5,900,000																**5,900,000**		**-5,900,000**
789C Truck Rims																		**0**		**0**
Tyres		1,350,000																**1,350,000**		**-1,350,000**
Other Accessories incl Assembly & Freight		4,000,000																**4,000,000**		**-4,000,000**
789C Dump Trucks x 2					7,567,122													**7,567,122**	**7,312,034**	**-255,088**
785C Dump Trucks x 2								5,120,000										**5,120,000**		**-5,120,000**
																		0		**0**
Hitachi EX3600 Excavators x 3		10,491,623	5,285,005															**15,776,628**	**16,078,404**	**301,776**
Hitachi EX1900 Excavators x 1					2,792,396													**2,792,396**	**2,680,701**	**-111,695**
																		0		**0**
																		0		**0**
Sandvik Drill Rig # 1		992,250																**992,250**	**1,458,500**	**466,250**
Sandvik Drill Rig # 2		992,250																**992,250**	**2,172,179**	**1,179,929**
Sandvik Drill Rig - D45KS DTH Blast Hole Drill Rig # 1		1,740,000																**1,740,000**	**2,172,179**	**432,179**
Sandvik Drill Rig - D45KS DTH Blast Hole Drill Rig # 2			1,740,000															**1,740,000**	**2,172,179**	**432,179**
Sandvik Drill Rig - D45KS DTH Blast Hole Drill Rig # 3																		**0**	**2,172,179**	**2,172,179**
Conversion - Titon Drill Rig # 1 to Remote Controls		250,000																**250,000**		**-250,000**
Sandvik Tamrock - Cable Bolt Drill Rig				2,000,000														**2,000,000**		**-2,000,000**
																		0		**0**
16H Graders x 2		2,110,000																**2,110,000**	**1,870,330**	**-239,670**
D10T Dozers x 4		5,099,441																**5,099,441**	**6,363,408**	**1,263,967**
																		0		**0**
CAT 773D Truck - Water Cart		1,000,000																**1,000,000**	**1,000,000**	**0**
Truck - Service		605,000																**605,000**	**1,000,000**	**395,000**
CAT 773D Truck - Fuel																		**0**	**1,000,000**	**1,000,000**
CAT 773D Truck - Stemming																		**0**	**1,000,000**	**1,000,000**
Mine Transport - 4WD Buse x 1		250,000																**250,000**		**-250,000**
Toyota Coaster Buses (Employee Transport) x 3		277,792																**277,792**		**-277,792**
																		0		**0**
CAT 854G Wheel Dozer						2,078,500												**2,078,500**	**2,078,500**	**0**
																		0		**0**
CAT 992G Wheel Loader					2,681,250													**2,681,250**	**2,475,000**	**-206,250**
																		0		**0**
777D Trucks x 3 (Prestripping of Clay)		3,971,448																**3,971,448**		**-3,971,448**
																		0		**0**
Commitment to Tender for Explosives																		**0**		**0**
Total		**64,438,239**	**7,025,005**	**2,000,000**	**13,040,768**	**2,078,500**	**0**	**5,120,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**93,702,512**	**100,533,814**	**6,831,302**