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12 March 2007

Department of Natural Resources, Environment and the Arts
Environmental Protection Agency Program
PO Box 496
PALMERSTON NT 0831

Attention: Mr Michael Browne

Dear Michael

Re: Mt Porter Additional Information Request

In relation to the letter of 9 March 2007 requesting additional information for the Mt Porter Project, we supply the following information.

1. Background

MBS Environmental and Arafura Resources are aware of and understand the approval processes relevant to mining projects in the Northern Territory. We understand the PER is being assessed under the terms of the *Environmental Assessment Act* and the Federal *Environmental Protection and Biodiversity Conservation Act*. The PER addresses the guidelines prepared by NRETA for the project and the Supplement addresses all items raised in submissions regarding the PER. The project, if approved, will also be required to meet the requirements of the *Mining Management Act* which is managed by the Department of Primary Industries, Fisheries and Mines (DPIFM). If the project has been deemed a Controlled Action under the *Environmental Protection and Biodiversity Conservation Act*, as Mt Porter has been, the MMP process is only entered into once Federal government approval for the project has been received. MBS Environmental understands that under the terms of the Bilateral Agreement, the Northern Territory has responsibility for assessment of the environmental impacts of the project, but does not have approval powers as these are not delegated. Recommendations made by the Northern Territory Minister for Natural Resources, Environment and Heritage will be considered by the Federal Minister for Environment and Water.

Answers provided in the Supplement referring to provision of information in the Mining Management Plan (MMP) refer to information that is legally required to be presented to and considered by DPIFM prior to authorising any activities at Mt Porter. Provision of detailed management plans is a requirement of the MMP process. All such management plans are required to take into account conditions that may have been set as part of approval of the project under the *Environmental Protection and Biodiversity Conservation Act* and recommendations made by the Northern Territory Minister for Natural Resources,

Environment and Arts. Discussions with DPIFM personnel for recent projects indicated that procedural arrangements had been made with NRETA regarding review and comment on the appropriateness and effectiveness of draft management plans submitted as part of the MMP process. Information presented in management plans is to operational level detail and focuses on:

- Implementation of management and mitigation measures described during the assessment process.
- Implementation of monitoring programs necessary to determine the effectiveness of management and mitigation measures.
- Establishment of data and information management practices.
- Definition of reporting requirements for project stakeholders.
- Allocation of responsibility for implementation of management and mitigation measures and monitoring programs.

These plans are prepared for use by operational personnel and to provide stakeholders, including regulators, with confidence that systematic measures will be taken to ensure adverse impacts are prevented or minimised. Such documents are considered dynamic by operations personnel and will be modified during the life of the operation to ensure they remain effective. The short duration of the Mt Porter project (less than 12 months) means that management plans are unlikely to be subject to substantial review or change.

MBS Environmental and Arafura Resources strongly oppose producing detailed management plans prematurely, that may satisfy regulatory authorities' needs for documentation, but have no practical or operational value. Responses made in the PER Supplement regarding provision of information in the MMP are not an effort to avoid preparation of plans, but rather provision of information, to the relevant level of detail, at the most appropriate stage of project development. It is considered that sufficient information has been provided in the PER and PER Supplement to enable environmental assessment of the project, with comfort that the proponent has identified all the issues necessary and has in place systems to address these issues.

2. Waste Rock Dump

The information below provides response to requested items 1(a-d) to 6. Part of this information was initially requested in an email from NRETA dated 27 February 2007. Other parts relate to specific questions in the email request for more information dated 9 March 2007.

The word "spontaneous" has never been used in the Arafura documentation related to this issue. The principle at question relates to the fact that oxidation of elements is a constant process and has been occurring on the earth for millennia.

The standard method of determination of carbon content is to burn the sample at high temperature and measure the evolved combined carbon plus oxygen as the gas carbon dioxide. This takes very few minutes at temperatures in excess of 1000º Celsius. Precisely the same mechanism occurs at 100º C or at 10º C, but the time required for the reaction is orders of magnitude longer for each of these reductions in temperature.

Oxidation of other elements also occurs in the same way. Iron is one such element that will oxidise (to form what is commonly called rust). Iron filings will burn but Arafura is not suggesting that a steel girder will spontaneously burst into flame, yet it will rust.

The principle raised in the PER document is that oxygen ingress into either *in situ* soil or rock structures or man made features such as waste landforms is governed by the porosity and permeability of the structure. Once inside, the fate of oxygen is dependent on many factors, both biological and chemical, with the principle that oxygen can combine with many elements, sulphur being one of them.

Graphite and amorphous carbon are extremely easily identified in hand specimen and are so identified in all the technical work undertaken by several companies on this project. As each of these minerals reacts with oxygen over long periods of time near to or on the surface (hundreds to tens of thousands of years), the carbon minerals slowly disappear. After full oxidation a black shale will often appear pure white at the surface making it quite easy to recognise. As little as five centimetres below the surface it may still be black with fresh sulphides still present. The oxidation timeframe for this five centimetre change could exceed one million years.

Blocky, strongly carbonaceous sulphidic siltstone occurrences commonly have fresh sulphide visible in outcrop or within a very few millimetres of the surface. In contrast, foliated sulphidic rocks with less or no carbon present can have all their sulphides weathered to considerable depths only metres from where strongly carbonaceous rocks outcrop at surface but still contain fresh sulphides.

Many such situations occur world-wide. It occurs at Mount Porter and many other locations in Australia. As an extreme example, the writer knows of a minesite in Jiu Jiang, Central China where fresh sulphides occur at the surface in graphitic siltstone on both sides of a 12 metre wide (galena)-pyrite-chalcopyrite lode (that contains no carbonaceous material). Within the lode, no fresh pyrite occurred to a depth exceeding 60 metres.

The carbonaceous host rocks in the Mt Porter project area are generally massive, non-foliar rocks that contain substantial quantities of elemental carbon in either amorphous form or as the mineral graphite. Oxygen penetration into these rocks can only occur along defined fractures or along the offset layers of carbon atoms that form the graphite structure. Due to differing size and opposing electrical charge, oxygen atoms form a loose bond with the carbon. As a result, the free oxygen content in the rock (Eh) can be extremely low.

After positioning in the waste landform, sulphide grains totally enclosed within fragments of the carbonaceous rock may remain unweathered for very long periods of time.

There are three major rock groups in the pit area at Mount Porter. These are:

a) Extremely weathered sulphide-free, low carbon content non acid forming (NAF) wastes within the top half of the pit. Former sulphides in this section are now replaced by iron oxides and the carbon has oxidised to carbon dioxide and escaped.

b) Deeper in the pit are relatively high carbon, low to moderate sulphide carbonaceous and graphitic shales which have a low content of gold and are classified as waste.

c) Generally lower carbon, non-graphitic more sulphidic siltstones and ferruginous cherty sulphidic banded rocks with a higher content of gold which are classified as ore.

The first deep rock type (type b above) is very largely (NAF) but towards the bottom of the open pit does become slightly sulphidic and potentially acid forming (PAF). Due to the inverted conical shape of an open pit the proportion of this material in the whole of the pit will be less than twenty-five percent and the PAF portion probably only one to two percent.

The very small proportion of this material with free sulphide will be blocky, easily recognisable due to its colour being black and in places shiny (due to graphite) plus the visible sulphides. Any potentially PAF material is likely to be in the range of 150 – 250 kgH_2SO_4/tonne and will be encapsulated in the waste landform.

The second deep rock type (type c above) will be strongly sulphidic, weakly to strongly PAF, but will be entirely removed for treatment as ore. None of this will report to the waste landform so will not be a factor relating to possible acid generation.

The quantity of sulphidic rock that will be incorporated into the Mount Porter waste landform will be less than two percent of the total volume of the waste. The total quantity of waste stated in the PER is 2.4 million tonnes, which put an estimate of the total PAF material at up to 48,000 tonnes. It will have a moderate content of pyrite and potential to produce in the order of 200 kg H_2SO_4/tonne. Because of its blocky texture, acid generation is likely to be extremely slow. Even if all of this material oxidises to completion, the whole of the waste landform will still only generate an average of less than 3 kg H_2SO_4/tonne, which qualifies as NAF.

To sum up, limited sulphide oxidation can still occur where the sulphides are exposed to water infiltration along cracks and joints in the host rock or in porous waste storage facilities. Where the sulphide minerals are encased in non-porous host rock, oxidation rates are extremely low. In waste landforms designed to encapsulate PAF waste in an impermeable clayey material, oxygen access to sulphides in the waste is minimised (it cannot be totally prevented), therefore oxidation rates are slow. Where the wastes have high carbon content, oxidation rates can be slowed further.

In specific response to items raised in the NRETA request for more information we provide the following:

Item 1(a).
The minimum target permeability of the encapsulation material has been identified as $1x10^{-7}$ metres per second. This equates to 3.15 metres per year. The optimal design permeability of 1×10^{-8} metres per second equates to 0.3 metres per year. The minimum permeability figure shows that the 3 metre capping depth would be sufficient to exclude water infiltration into the underlying PAF cell. These permeabilities assume a constant hydraulic head. In reality, this will not exist and with the water shedding design of the waste landform, ‘standing water’ on top of the PAF cap cell will occur rarely if at all. Thus the three metres capping depth is considered a very conservative cover depth.

Item 1(b).
The description above clearly shows the weathered oxide material in approximately the top half of the pit is NAF. Appendix 3 of the PER provides details of the water and acid leach tests for waste rock and adjacent soil types that will not be mined.

Item 1(c).
See response for 1(a).

Item 1(d).
The following text is provided in Section 3.8 (1) of the PER Supplement document.

> The remaining 21 samples have negligible acid production capacity. Most of this comes from the upper 40% of the open pit and represents about 80 – 85% of the total oxide waste. On the estimated total of 2,400,000 tonnes of waste rock, this equates to over 1,900,000 tonnes. This shallow oxide will be relatively high in secondary clay minerals and substantially less porous than deeper oxide.

Due to the inverted conical shape of the open pit and the fact the majority of the material in the base of the pit (the point of the cone) is ore, the top half of the open pit will actually contribute over 80% of the total waste material. It is considered there will be ample quantity of high clay content waste material for containment of the low quantity of PAF waste.

Item 2 and 3.
The PER and PER Supplement documents makes repeated statements that the waste landform will be designed with a convex (water shedding) top surface. It will not be designed as a store/release cover system, as outlined in TEAM NT (2004). The proposed depth of topsoil to be replaced over the waste landform is difficult to predict. The depth of topsoil stripping is nominally given as 200 millimetres. However, the steepness of terrain in some portions and shallow topsoil with outcropping rock in other portions are some of the factors that determine that not every square metre of disturbed land will have topsoil removed. All topsoil removed will be respread in the rehabilitation process. It is anticipated the depth of topsoil will be approximately 100 millimetres.

Item 4.
This is addressed above and also in Appendix 3 (specifically Section 5.2.1) of the PER.

Items 5 and 6.
This is addressed above.

3. Sedimentation Basins

Sediment basins will be constructed to contain runoff from all operational areas where sediment is identified as a potential surface water contaminant. Given all mining activities are scheduled to be undertaken in the dry season, sediment basins will only be required to manage runoff from decommissioned areas until these surfaces have been stabilised with vegetation over time. Sediment basins will be designed in accordance with Water Quality Protection Guideline No 6. *Mining and Mineral Processing: Minesite Stormwater* (2000) produced by the Department of Environment, Water and Rivers Commission and Department of Industry and Resources-WA. The minimum design standard is to retain water from a 1 in 20 year event.

It is considered the appropriate location for the detailed design of the sedimentation basins is in the MMP. These details may include a review of the drainage off the waste landform if the design shows that the capacity of the sediment basins needed to cater for the volume off the current catchment (which include the natural hillsides on each side of the waste landform) is excessive. Reducing the catchment to the waste landform only will reduce the required capacity of the sediment basins.

As stated in the PER and Supplement, Arafura will conduct water quality monitoring after completion of mining activities to ensure downstream water quality is not adversely affected by the project. The duration of monitoring will be dependant on monitoring results and is anticipated to be subject to discussions with DPIFM personnel as the lead agency for management of mining operations.

As stated in the PER Supplement, Arafura will engage suitably qualified personnel to conduct regular inspections during wet seasons following completion of mining to ensure sediment ponds remain in a condition suitable to achieve their design objectives. It is anticipated this will involve removal of accumulated sediment prior to the wet season and periodic inspection during the wet season to ensure the basin is functioning. Removal of accumulated sediment during the wet season may also need to occur if the inspection determines the basin is full.

Where rainfall events exceed the sediment basin design capacity, residence time will be reduced and small particle removal efficiency will decrease. The water courses in the Mt Porter area are ephemeral in nature. Limited monitoring data and anecdotal evidence suggests that these ephemeral systems are naturally subject to highly variable suspended sediment loads. The environmental risk associated with sediment loads likely to be added during such events, given the small size of the potential disturbed area, short duration of exposed surfaces and dilution effects in the receiving environmental are considered to be low.

4. Neutral Drainage

Item 10.
The waste characterisation study conducted by MBS Environmental and presented as Appendix 3 of the PER detailed results of water and acid leaching of waste materials likely to be generated by the project. Concentrated water leachates have been prepared from all waste types and also from existing soils and these results compared with local waters. The leachates are indicative of the total amount of contaminants that can be leached from these materials over a significant time frame.

Results of this testing indicated that leachate values will be similar to the existing background soil samples. None of the waste leachates appear anomalous when compared with equivalent leachates from surface soils, or from the natural spring and stream waters. The natural waters have higher pH.

The moderate content of iron and manganese in samples containing fresh carbon is probably due to a very low dissolved oxygen content and weakly acidic pH. The minor contents of base metals are likely to precipitate as they oxidise, which will happen when any leachate mixes with rainwater.

There is unlikely to be any contaminant problem related to the NAF waste material. In fact, the leachates from mine wastes contain comparable or lower contaminants than soils from the background area to the east of the minesite.

Management measures presented in the PER took into account likely leachate products from all waste types, not just from Potentially Acid Forming (PAF) waste.

Item 11.
Preparation of a Water Management Plan at this stage of project development is considered

unnecessary by Arafura. In relation to specific items mentioned in your letter we provide the following comment:

- No pit dewatering requiring discharge is anticipated to occur. Mining will only occur during the dry season. Limited groundwater is likely to be encountered and the small volumes that may be encountered can be adequately managed by collection in a sump in the base of the pit and re-use for dust suppression. No mechanical dewatering will be undertaken. Rainfall accumulated during the wet season following completion of mining will be contained in the pit void and left to evaporate.
- No need for waste water discharge from the site is anticipated. The water balance presented in the PER clearly demonstrates this. Section 4.8.1 states "Excess water is only likely to result from significant rainfall. In such situations, water will be discharged to natural watercourses." Table 1 is notated with "* Contingency for discharge if dewatering volumes exceed site usage" to further clarify that discharge is consider to be an unusual occurrence.
- The conceptual waste rock stockpile design described in the PER clearly states it aims to be water shedding. Potential for seepage from the stockpile only exists as a result of movement of water in the pre existing drainage lines the stockpile will cover. As described in the PER, agricultural drainage pipe will be installed in the base of each drainage line prior to construction of the waste rock stockpile. This will facilitate movement of water not captured by upstream diversion infrastructure to lower catchment areas. Given the waste dump is located high in the catchment, very limited catchment areas exist to contribute to seepage through the dump.
- Contaminated water treatment will be confined to:
    - Removal of sediment, oil and grease from water used to wash down heavy equipment or light vehicles prior to maintenance. All water from such activities will be collected and passed through triple interceptor type systems prior to re-use or discharge to evaporation basins. At the conclusion of the project, all maintenance facilities will be removed. Bioremediation products will be used to treat any hydrocarbon spillages to land as they occur. This will minimise potential for hydrocarbon contamination of surface runoff from maintenance areas after they are decommissioned.
    - Removal of sediment from runoff from operational areas such as open pit surrounds, waste rock stockpile, haul roads and ore stockpiles. Water from these areas will be directed via purpose constructed drains into sediment basins. Details regarding sediment basin construction is presented in Section 2 of this letter.
    - Treatment of sewage from office and ablution facilities. As described in the Supplement, commercially available sewage treatment or septic systems will be used. All such systems will be subject to approval from the Department of Health and Community Services prior to commissioning. All such facilities will be removed on completion of mining operations i.e. prior to start of wet season.

Item 12.
No irrigation is proposed during the life of the project. As such the request for an irrigation management plan is redundant.

Item 13.
No water discharge is anticipated during the life of the project as demonstrated by the water balance presented in the PER and Supplement. Mining will only be undertaken during the

dry season. Groundwater resources are limited in nature and will not affect mining operations. As no waste water is likely to be discharged, the request for information regarding waste water quality is redundant.

Item 14.
Pit dewatering waste water (should it occur) will be consistent with groundwater quality in the region as it will not reside in the pit long enough for exposed sulphides to increase acidity levels.

Regionally, the groundwater is typically of low salinity with high levels of bicarbonate and a pH that is slightly acid to slightly alkaline. The fractured aquifers of the study area are characterized by groundwater that rarely exceeds a salinity of 700 milligrams per litre, is high in bicarbonate and contains the cations calcium, magnesium and sodium in proportions tending to be highest in magnesium. At the onset of operations, more detailed groundwater quality data will be obtained as part of normal monitoring requirements.

It is unreasonable to expect an estimation of quality of contaminated water from hydrocarbon storage areas, workshops and the equipment wash-bay given that waste water from such areas is not being discharged into the environment. The treated water from these areas is directed to a contained evaporation pond.

Item 15.
Clean water from natural catchments will be diverted around operational areas to minimise the volume of water requiring treatment. Given the location of operational areas high in the catchment, minimal volumes of water will be required to be diverted. Diversion will only occur after completion of mining activities as all mining will occur in the dry season. Water from decommissioned operational areas will be treated via sediment basins whilst stabilisation with vegetation occurs.

Item 16.
As the site is located high in the landscape in an ephemeral creek system, there is no surface water and leaching occurring over the bulk of the dry season. The 10 fold dilution given in the PER during the wet season will further dilute the concentration of any leachate produced (see point 10 above). On the basis of the information provided, it is considered there is no basis for the statement made by NRETA that the "1:10 dilution proposed in the PER may be insufficient for some of the aquatic toxicants likely to be discharged from the site".

Arafura considers that the statement made that there may be insufficient dilution for some aquatic toxicants likely to be discharged from the site, is a subjective statement that is not substantiated. The PER and Appendix 3 in particular shows that leachates from the waste landform is not significantly different from background levels in the surrounding environment. Can NRETA provide more details on the specific toxicants they consider may be in such concentrations that a ten fold dilution would still render them detrimental?

At this stage of operational development, no water treatment systems are proposed for the pit void and waste landform.

Item 17.
This is addressed in Section 4.2 of the PER Supplement. Commitment was made in the PER Supplement to implement limnological monitoring (Commitment S17 and S19). Similar commitment was also made by Territory Iron for the nearby Frances Creek project. Arafura is in discussion with Territory Iron regarding development of a combined limnological

monitoring program. MBS Environmental has had discussions with NRETA and Federal DEWR personnel regarding program requirements and is in the process of evaluating proposals sought from a range of consultancy groups with recognised experience and qualification for limnological monitoring.

5. Groundwater Modelling

Item 18.
Commitment 9.3.2d in the PER provided for post mining monitoring of groundwater levels and quality. It is anticipated that additional monitoring bores will be constructed during mining operations, when machinery is available, to implement this commitment. This is considered sufficient information to address the issue of groundwater monitoring at the project assessment stage of the development. The location (when constructed) and depth of the monitoring bores will be included in the MMP.

Item 19.
It is not considered that three dimensional computer modelling is required for this project. The information supplied in the PER, the PER supplement and responses to the questions above, show the project to be low risk and of short duration. The quantity of PAF material is small and the waste landform (being designed to shed water) is not anticipated to generate leachate.

The PER Guidelines for the project, issued by NRETA do not specify three dimensional computer modelling is required.

Item 20.
Similarly, contaminant transport computer modelling over a 20 year time period run for a host of differing scenarios is considered extremely excessive for the scale and nature of this project and is also not specified in the project PER Guidelines.

Item 21.
The hydro-geological report (PER Appendix 4) and the surface hydrology study (PER Appendix 5) explain that Pandanus Waterhole and the unnamed bore are in the valley system to the south of the open pit. This is a different valley to which the waste landform is located. PER Appendix 4 states that there is limited groundwater connectivity between the open pit and the unnamed bore due to the presence of a large fault structure that acts as a barrier to groundwater flow.

Item 22.
Beneficial uses are described in the PER Section 7.6.2. Surface water management is described in the PER Section 9.4. The information presented shows that any possible impact to downstream beneficial uses will be negligible.

Item 23.
As with points 19 and 20 above, computer modelling of long term pit water levels and quality is not considered necessary. The hydrological information presented in the PER and PER supplement show that aquifers are generally low yielding, to the extent that the risk of placing PAF material back in the pit was considered a higher environmental risk than encapsulation in the waste landform because of uncertainty that the minimum water level would not provide effective cover against oxidation.

6. Gold Processing

Item 24.
As stated in the PER Supplement, the Union Reef Gold plant is an activity approved by NRETA and regulated by DPIFM. The plant uses conventional Carbon in Leach (CIL) gold processing technology. Arafura will enter a toll treatment arrangement with Union Reef. Union Reef has stated this will not affect approved activities. No changes to approved infrastructure will be required.

7. Rehabilitation

Item 25.
Rehabilitation and Closure is addressed in the Draft Environmental Management Plan which formed Appendix 10 of the PER. Given the short duration of the project (less than eight months), preparation of two separate plans is not warranted. Rehabilitation and closure will be undertaken as a single action. Information contained in the draft EMP is considered sufficient for the assessment process. If the project is approved, submission of Rehabilitation Plan is required under the *Mining Management Act* and Arafura will prepare and submit the plan for consideration at that time.

Item 26.
Contemporary accepted industry best practice refers to rehabilitation methods currently used and accepted in the mining industry as being an effective means of achieving the desired rehabilitated landforms and surfaces. This may include methods of waste landform slope design, revegetation or and post-mining rehabilitation monitoring. It is a commitment to implement up-to-date methods that are consistent with research and experience in effective mine rehabilitation.

Item 27.
A number of commitments were made in the PER and draft EMP regarding contingency plans in the case that rehabilitation management and mitigation measures are not effective. Commitments relevant to contingency for re-vegetation, erosion control and acid rock drainage proving not to be effective include:

- The rehabilitated waste rock stockpile will be inspected for erosion, particularly after significant rainfall events. If soil erosion is observed during routine inspections, appropriate remediation measures will be implemented.
- Post-mining monitoring will be conducted to establish the effectiveness of rehabilitation. Monitoring will include consideration of physical stability, erosion, minimisation, vegetation establishment (species diversity, density, cover) and weed presence.
- Re-vegetated areas will be inspected until the regulatory authority agrees that they are self sustaining and that habitat restoration objectives have been achieved. Inspections will determine additional actions necessary to achieve the objectives such as providing water, fertiliser, reseeding, replanting and/or protecting (e.g. by fencing) areas that have been damaged by drought, fire or over-grazing by wildlife.
- The integrity of waste rock stockpile rehabilitation (particularly the slopes) and the stability of rehabilitated surfaces where infrastructure was located will be annually assessed and, as appropriate and necessary, corrective action taken:

The appropriate location for the implementation detail is in the MMP. Contingency plans in the post-closure phase of operations, should they be required, will be developed in consultation with DPIFM.

8. Final Pit

Item 28.
An abandonment bund will be constructed as per DPIFM safety requirements to prevent free access to the completed pit. It is recognised however that this structure will not prevent fauna access to the final pit. The pit access ramp is left on completion of mining. The ramp may facilitate access to the pit, however it will also allow free egress of fauna. The final pit will contain water of varying levels depending on time of year and climatic conditions. Based on annual rainfall of 1812 millimetres, annual evaporation of 2775 millimetres and limited presence of groundwater, water levels in the pit are not anticipated to exceed 35 metres depth on average. Water quality is not anticipated to cause acute death of fauna. No reason for fauna entrapment in the pit is foreseen.

Item 29.
As described in Section 4.2 of the PER Supplement, some long term degradation of pit water quality is anticipated. Monitoring of pit water quality and groundwater will be undertaken in the post mining phase to assess levels of water quality deterioration. Mitigation measures will only be considered if the quality of the pit water poses a serious threat to the surrounding environment, aquifer and/or public health.

This is an unlikely scenario given that any contaminated water will be confined to the pit and adjacent aquifers due to the low porosity and permeability of the rock walls. MBS Environmental and Arafura consider it unnecessary to consider any major remediation works at this point in the project development.

Item 30.
This topic was clearly detailed in Section 3.8 of the PER Supplement. To reiterate, returning PAF material to the pit floor poses a greater environmental risk than the current proposal of encapsulation in the waste landform. It is difficult to reliably predict the final depth of the pit lake and the level of fluctuation between the wet and dry seasons. This creates the possibility that if all high PAF waste was returned to the open pit, there may be periods where there is insufficient water cover to prevent oxidation and acid generation.

Returning PAF material to the open pit would only be beneficial if emersion could be guaranteed. If this was possible, returning PAF material to the pit would minimise the works required for development of a suitable waste landform and associated encapsulation envelop.

The cost of returning PAF material to the open pit would not be un-economical as only 2% of the waste is characterised as PAF. An estimated figure for the rehandling of waste (approximately 48,000 tonnes) is approximately $30,000. While cost considerations are always significant in any operation, in this instance it does not define the reasons for the preferred option of encapsulating PAF material in the waste landform.

In summary, at this stage of project development, returning PAF material to the pit would be considered a high risk strategy. Given the limited volume of groundwater in the area, high evaporation rate and the need for maintenance of at least one metre cover of water over all PAF material for perpetuity to prevent acid generation, this is considered a high risk

management measure. Placement of PAF material in an out of pit waste dump where it can be appropriately encapsulated is a lower risk option.

We look forward to meeting with you to discuss this information in more detail.

Yours sincerely
MBS Environmental

Kristy Sell
Director Environmental Science

cc. Arafura Resources - Attention: Mr Steve Mackowski