Attachment A

Further Information Request – Mt Porter Gold Project – March 2007

Background:
The following issues are being raised because they are environmentally relevant and have not been adequately addressed in the *Supplement,* as requested in the comments provided on the Public Environment Report (PER). Information on these environmental issues is necessary to facilitate examination required under the *Environmental Assessment (EA) Act*. The Mining Management Plan (MMP) is presented after finalisation of the environmental assessment process, so commitment to submit such information on these issues in the MMP will generally not be considered a suitable response. The Assessment process is suspended until the proponent submits the information requested and it is deemed adequate for assessment to occur.

Waste Rock Dump (WRD)

Potentially Acid Forming (PAF) material is proposed to be encapsulated within a 3m deep envelope of oxide waste rock (PER s4.7, s11.3.2) stripped from the upper benches of the pit.

Certainty needs to be provided that Acid Rock Drainage issues will be minimised through the availability of sufficient amounts of clay material with the correct properties, to effectively cover the WRD at the appropriate thicknesses.

1) Given the importance of excluding water and oxygen from the cell of PAF waste material (PER s.11.3.2), provide design details and physical characteristics of the material proposed to encase the PAF cell. Provide:
    a. Water transmission rates/permeability rates for the encasing material and for the PAF material itself. Describe theoretical permeabilities used to predict WRD seepage, and to what extent this is attainable in practice.
    b. Describe the potential of the material to be used to encase the PAF cell to itself generate acid or non-acidic rock drainage.
    c. Describe on what basis a depth of 3m for the liner was proposed.
    d. Indicate available sources and amounts of clay or low permeablility material suitable sufficient for containment of the PAF material.

2) Indicate the proposed depth of the WRD growth medium / topsoil cover and relate this to store/release principles as outlined in *TEAM NT (2004): Ch. 4.*

3) Quantify the total amount (tonnes) of rock characterized as PAF.

4) Quantify the amount of acid seepage to be delivered from the WRD over a specified time period. Assume high rainfall.

5) Describe seepage from the WRD (quantiy and quality) and proposed monitoring and treatment/management contingencies if found to contain elevated levels of acids, minerals or salts.

Statement is made in the Public Environment Report (PER) that:

> *The … content of significantly PAF material … all contain carbonaceous siltstone-BIF with visible sulphides. Because of the high free carbon content, the Eh value within waste rock stockpile of the PAF material should be extremely low and non-oxidising, thus minimising sulphide oxidation and the potential for acid generation.*

As already requested informally:

6) Provide clarification of these concepts with the support of quotes from scientific or mining journal references. Use quantitative descriptors (eg. kg /tonne; reduced by *X* %) and examples rather than qualitative terms (eg. minimised).

Sedimentation Basins

Indicate to what extent sedimentation basins will be able to effectively capture acid, metal and salt seepage in expected and worst case scenarios:

7) Present design standards for the sedimentation basins – i.e. to what size particles, and to what level of treatment;

8) Present a management plan for the sediment basins, including contingency arrangements if water quality monitoring determines unacceptable discharges are occurring.

9) Specify design parameters of sedimentation basins in terms of Average Recurrence Interval (ARI) rainfall events. Predict the consequences of rainfall events exceeding ARI design thresholds.

Neutral drainage

Mine drainage does not have to be acidic to contain environmentally significant concentrations of dissolved metals and or salts. Potential exists for non-PAF rock placed in the waste rock dump and in various land-contouring situations to create neutral drainage of minerals and salts.

10) Present characterisation, management, monitoring and contingency plans to address any such potential.

Water Management and Water Quality

11) Present a Water Management Plan, including but not limited to pit dewatering, seepage through the waste rock dump, contaminated water treatment and waste water discharge. Flow charts should be presented of all components of the water management and treatment system with water balance, rainfall, evaporation and annual through-volumes marked.

12) Provide details of irrigation management plans including water balances, irrigation schedules, vegetation types and soil limitations.

13) Provide description of the required discharge regime from the activity. The water management system should be designed to be zero water discharge as a Best Practice Environmental Management measure (or at least zero discharge to an ARI of 1:10).

14) Estimate wastewater quality and provide details on how this was estimated, including parameters used.

15) Provide detail on water separation systems based on quality or use within the water management system, particularly dewatering water (PER s.9.4.6).

16) 1:10 dilution proposed in PER s.9.4.4 may be insufficient for some of the aquatic toxicants likely to be discharged from the site. Discuss treatment systems for contaminated water, particularly from the pit and WRD.

17) Undertake biological monitoring (eg AUSRIVAS) on local streams to create a statement of ecosystem condition that could be used to set a level of species protection. Sampling should include representative aquatic ecosystem sites upstream (if available) and downstream of the mine site, and correlated upstream and downstream reference sites in unaffected similar catchments. Water quality management should defer to the strictest standard.

<u>Groundwater modelling</u>

2) Detail plans for any groundwater monitoring bores to be used to monitor for development of groundwater contamination plumes from the pit or WRD.

3) Groundwater modelling (eg. MODFLOW) should be undertaken to the extent that 3-dimensional mapping occurs of aquifers intersected by the pit, or potential seepage from the waste rock stockpile, occurs and is presented pictorially.

4) Present contaminant transport modelling under major components of the mine (incl. waste rock dump, open pit) over a 20 year period. Model transmissivity through WRD caps, liners, surrounding soils/geology, groundwater aquifers. Run models with materials proposed, as well as in scenarios of:
   - Differing permeabilities of (PAF cell) liner rocks;
   - Differing permeabilities of WRD cover layers;
   - Development of termite colonies and vegetation growth through WRD capping layers;
   - Degradation of the (PAF cell) liner;

- High rainfall years; and
- Seasonal variations.

5) Flow dynamics and expression points of affected aquifers should be predicted, with estimates of time lags before contaminated plumes would be expected to emerge as surface flows. Pandana Waterhole is described as being 350m downstream from the mineralised area. Predict impacts on this waterhole through groundwater modelling.

6) Predict potential downstream impacts of the mine relative to beneficial uses and users, of the aquifers.

7) Present modelling of progressive and long term pit water depths (AHD) and water quality, through wet and dry seasonal extremes.

Gold Processing

8) Provide a general outline for the general reader of the processing technologies to be used at Union Reef in the processing of Mt Porter gold ore.

Rehabilitation

9) Present a draft Rehabilitation Plan and draft Closure Plan.

10) Describe in practice what the statement *'rehabilitation will be performed in accordance with contemporary accepted industry best practice'* (PER s.11.3 / App.10:15) means to the proponent.

11) Present commitments and contingency plans against a situation where revegetation and erosion control, or acid mine drainage prevention, are found over successive wet seasons to be inadequate.

Final Pit

12) Describe long term closure methods planned to manage fauna access, prevent entrapment and allow escape.

13) Describe potential mitigation measures against long term degradation of pit water quality.

14) Discuss in detail potential environmental impacts and benefits of returning PAF material to the open pit post-mining. In relation to predicted pit depths determined from groundwater modelling, describe the likely extent of full immersion possible for PAF material over a 20 year cycle. Estimate the cost to Arafura Resources of this exercise.

References:

TEAM NT(2004) Northern Territory Minerals Council (Inc.) and the Mines and Petroleum Management Division of the Northern Territory Government, 2004, *TEAM NT: Technologies for Environmental Advancement of*

Mining in the Northern Territory: Toolkit, D.R. Jones and M. Fawcett, principal authors. Posted on the ACMER website at: http://www.acmer.uq.edu.au/publications/attachments/TEAMNTToolkit.pdf