

MEMORANDUM

To: Alice Smith
From: Mike Sutherland
Subject: Modifications to Consent Conditions 7.23

File No: **Date:** 21 October 2013

In relation to Alkane Resources Ltd, Tomingley Gold Project Approval dated 24 July 2012, Appendix 7 - Statement of Commitments, Condition 7.23 *Monitor the concentration of WAD cyanide within the RSF, the presence or otherwise of any standing water on the surface of the facility and wildlife mortality if any.*

Alkane will be seeking approval from the EPA to modify the Environment Protection Licence condition below regarding a specific monitoring point within the RSF to one which would be at the Processing Plant.

I seek your opinion on whether or not this is a matter for Department of Planning and Infrastructure (given the words in red above). The attached plan shows the proposed change in location of the monitoring point.

In relation to the Scheduled Activity Environmental Protection Licence 20169 Tomingley Gold Mine issued on the 4th Sept 2013, P1 Location of monitoring/discharge points and areas – EPA Identification No. - 2 *Discharge and monitoring to tailing storage facility* location.

The location description for this EPA Identification No is:

*Located South of the Process and
Raw water dams, as shown on Map
titled "Water Monitoring Locations",
DOC13/35050.*

This monitoring point refers to the Residue Storage Facilities (RSF) and is to be sampled daily for Weak Acid Dissociable (WAD) Cyanide.

TGO is requesting for the location of this monitoring point to be changed to the Final Tailings Pumps located within the processing plant (613430mE: 6394420mN MGA). The figure below shows the EPL location and the proposed location. Justification of the change is outlined below.

Sample Location Comparison

Collecting the daily WAD Cyanide, EPA ID 2 - *Discharge and monitoring to tailing storage facility* in the proposed location (Final Tailings Pumps) would **always** result in a **higher** WAD Cyanide level than at the discharge point to the tailings storage facility for the following reasons:

1. Cyanide is used at Tomingley Gold Mine in the leaching of gold from ore and the elution of gold from carbon. The cyanide solution is pumped from the storage tank to the leaching



circuit, where it is added to ore slurry. This addition of cyanide (in the leaching circuit) occurs prior to the proposed EPA ID 2 monitoring point (which is located in the tailings circuit). There is no addition point for cyanide following the proposed sample location. That is, there is no mechanism for WAD Cyanide to increase in the tailings between these two points.

2. There are several mechanisms for WAD Cyanide levels to decrease between the proposed sample point location and the discharge point to the tailings storage facilities. The potential decay paths for WAD Cyanide in the tailings within the tailings delivery pipeline includes:
 - Chemical destruction: where WAD Cyanide continues to decay from the addition of sulphur dioxide (SO_2) as sodium metabisulphite (SMBS). That is following the initial destruction of WAD Cyanide at the cyanide destruction point within the processing plant, the cyanide destruction reaction would continue for approximately 20 to 30 minutes, and would therefore continue for tailings within the tailings delivery pipeline and following discharge into the tailings storage facilities.
 - Volatilisation: where WAD Cyanide decays to produce hydrogen cyanide gas (HCN). Agitation required for volatilisation occurs via pumping mechanisms following the proposed sample location along the tailings delivery pipeline.
 - Precipitation: where decay of WAD Cyanide occurs through the formation of insoluble salts from iron cyanides. This process would commence for tailings within the tailings delivery pipeline.
 - Adsorption: where organic matter in soils (including soils in the tailings within the tailings delivery pipeline) become bound or oxidised to cyanate, thereby reducing the total amount of cyanide available in the form of WAD Cyanide.

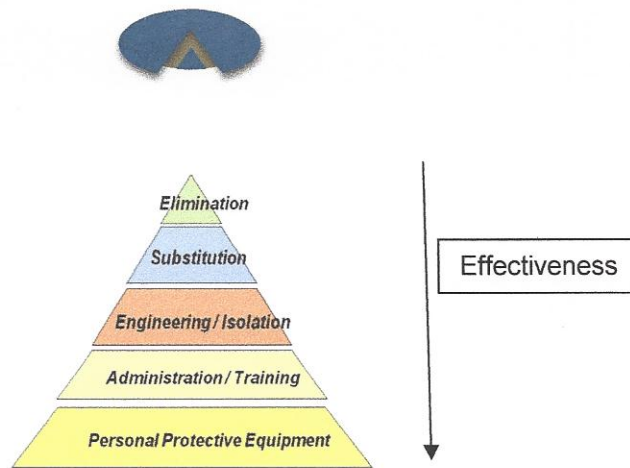
Occupational, Health & Safety Risks

Collecting the EPL ID 2 -*Discharge and monitoring to tailing storage facility* sample from the RSF as currently described in the EPL 20169 Tomingley Gold Mine has some catastrophic safety concerns with the potential for a fatality.

To access the tailings discharge point to collect a sample a TGO employee would need to scale down the inside wall of the RSF. This wall is a steep embankment with a 1:1.5 slope angle. Below the tailings discharge point would be active liquefied tailings. Some of the personal safety hazards associated with this process are:

- falling into the active tailings dam and becoming trapped with the potential of drowning;
- slipping down the wall and causing serious injuries;
- being exposed to process slurry containing chemicals due to poor body positioning during sampling;
- manual handling injuries when trying to carry the sample up the embankment.

When an evaluation of controlling the safety hazards associated with this task was conducted, the "Hierarchy of Control" (shown in the figure below) was used.



The WAD Cyanide sample must be taken so “Elimination” was not possible, however, by substituting the sample location from the RSF to the proposed location at the Final Tailings Pumps (613430mE: 6394420mN MGA) the safety hazards associated with the taking the sample are insignificant.

Adopted EPA ID 2 - *Discharge and monitoring to tailing storage facility Location*

Due to the catastrophic safety concerns (potential of fatal incident) associated with collecting the EPL ID 2 -*Discharge and monitoring to tailing storage facility* sample from the RSF and that the proposed location will always result in a higher WAD Cyanide level being reported. TGO strongly recommends changing the EPL ID 2 -*Discharge and monitoring to tailing storage facility Location* to the Final Tailings Pump located within the processing plant (613430mE: 6394420mN MGA).



TOMINGLEY GOLD OPERATIONS PTY LTD
(A SUBSIDIARY OF ALKANE RESOURCES LTD)

TOMINGLEY GOLD OPERATION

Environmental Monitoring

EPA ID 02

Current and Proposed Location

Projection - AMG Zone 55
Datum (horizontal) - AGD66

Geology: Alane (SP) Plan No.: ALK TOM 1DG-049
Drafted: DJM Date: 21 October 2013 Figure No.: