

## ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

If risks have not been previously identified, **Table 3 Environmental Risk Identification** of the MOP format (page 17 of this guide) should be included at this point of the AEMR.

	Exploration	Land preparation, vegetation & topsoil stripping	All construction activities including earth moving	Mine development and mining, surface & u'ground	Use/maintenance of roads, track and equipment	Waste rock emplacement management	Mineral processing facilities and infrastructure	Ore/product stockpiling and hand	Tailings impoundment managem	water management including sto event contingencies	Hazardous materials & fuel, handling/spills management	Sewerage	Rubbish disposal	Rehabilitation activities	Rehabilitated land and remaining features
air analysis, dust/other															
erosion/sediment minimisation															
surface water pollution															
ground water pollution															
contaminated or polluted land															
threatened flora protection															
threatened fauna protection															
weed control & management															
operational noise															
vibration and air blast,															
visual amenity, stray light															
Aboriginal heritage															
natural heritage conservation															
spontaneous combustion															
bushfire															
mine subsidence															
hydrocarbon contamination															
methane drainage/venting															
public safety															

### 1.1 Air pollution

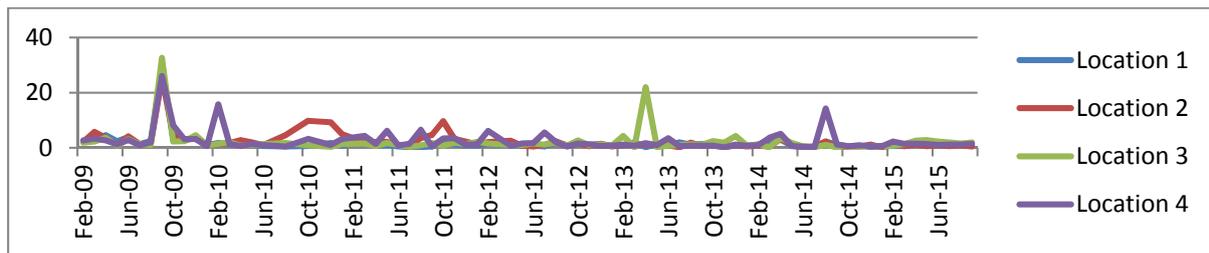
No complaint for dust was received for the period to the cessation of mining in June/July 2014 however we did raise the matter of dust on a couple of occasions when discussing various other matters with the closest neighbour to the NW of the project site. In general terms the issue of dust only arises when wind originates from the SE.

The project dust monitoring program indicated that the mine production and milling operation had no effect on the dust level counts since the commencement of production. This monitoring program has been conducted by site personal every month in four locations around the mine site and the testing is undertaken by an approved laboratory.

The graphical representation depicted below indicates measured dust levels over the period of collection of data for the 12 month period.

There have been no dust complaints since the site went on to care and maintenance at the end of operations.

**Figure 1: Dust levels (5yrs)**



- Location 1** Herb cottage/Costell’s Vineyard as identified on dust monitoring location map dated 22/2/08
- Location 2** Property labelled as “Old Post Office” on figure 2.1 Generalised project site layout pg 21 of Broula King Gold Mine EIS 2005
- Location 3** Property labelled as “Shadelands” on figure 2.1 Generalised project site layout pg 21 of Broula King Gold Mine EIS 2005
- Location 4** Southern boundary of “Shadelands” property as identified on map dated 22/2/08

The elevated results in June/September coincide with increased annual agricultural activity (soil cultivation).

## 1.2 Erosion and sediment

Erosion and sediment controls in place. Up till winter 2016 the site received less severe rain events than for earlier periods resulting in minimal run-off. Throughout the period sediment traps were monitored and cleaned as and when required.

The prevention of sediment discharge from site is primarily by the use of sediment dams which provide storage capacity for rain water run-off to allow time for the sediment to settle out in the dams. The water in these dams is then pumped into the TSF where it is removed by evaporation over summer. The sediment dams are kept empty by pumping the water collected after each rainfall event into the TSF.

If storm water does discharge off site from the sediment catch ponds it is sampled each 24 hours as required in the EPA licence. This occurred once in 2015 and three times to-date over the very wet winter/spring of 2016.

The wet weather has caused silting of the sediment ponds reducing their water holding capacity. In consultation with the regulatory authorities we have organised to mobilise an excavator and truck to site to desilt selected sediment ponds. Experience indicates that at full capacity the sediment dams can hold run-off from a 60mm rain event. This de-silting has been delayed by continuing wet weather.

### 1.3 Surface water analysis

An area was set aside to store acid generating waste adjacent to both the open cut and the ROM pad in the gully below the ROM pad and above the TSF. An oversized catch dam was created below the area designed for the acid generating waste to collect all storm water. With minimal rain run off all water was readily contained, even so all excess water was gravitated by overflow pipe to the TSF. The water collected in this catch dam is monitored after each rain event to determine if pumping/syphoning is required to at all times minimize the water captured and provide for maximum yield in the event of a severe rain event. Some pumping was completed after a few severe rain events to maintain maximum water catchment capacity and avoid concentration of chemicals as a consequence of evaporation.

There have been four surface water discharge events since the site was placed on care and maintenance, three in the 2016 winter. Discharge water analyses are summarised in the following table.

Parameter	unit	LD	Sample Date					
			25-Aug-15	26-Aug-15	6-Jun-16	7-Jun-16	23-Jul-16	3-Sep-15
Suspended Solids	mg/L	5	50	98	32	38	14	60
pH Value	pH unit	0.01	3.48	3.72	7.59	7.43	3.82	4.30
Elec Conductivity	µS/cm	1	1460	1400	989	965	956	397
WAD Cyanide	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Oil & Grease	mg/L	5	<5	<5	-	<5	-	9

There has been some variation in the turbidity readings which is probably related to retention time in the sediment dams. The oil, grease and WAD cyanide analyses indicate there is no contamination in the rain water system.

The low pH readings are of concern and work has been put into determining the cause of this. Possible causes for the low pH readings in the stormwater discharge include:

- Sampling or analysis issues
- Water sitting in contact with rotting vegetation or humus
- Contamination of the stormwater system with chemicals on site
- Contamination of the stormwater system with other low pH water on site (pit water, PAF waste run-off etc)
- Natural groundwater pH
- Contact with naturally acidic country rock
- A component of PAF waste in the TSF wall creating low pH seepage.

In order to locate the cause a sampling program was initiated where all surface water on site was sampled on a regular basis and the pH tested. A full analysis of the results has not been conducted yet because two potential sources of contamination were identified recently and additional readings need to be taken.

### 1.4 Ground water analysis

Nil

### 1.5 Contaminated polluted land

Nil

## **1.6 Threatened flora**

Nil

## **1.7 Threatened fauna**

Nil

## **1.8 Weeds**

Various weeds [Blackberries and general broad leaf varieties] have been detected onsite. With the exception of blackberry weeds are under control. Attempts to eradicate the blackberry have had mixed results. Infestations of blackberries on neighbouring properties are evident particularly to the south of the project site.

### **1.8.1 Blasting**

There has been no blasting over the care and maintenance regime.

### **1.8.2 Operational noise**

Monitoring during production was undertaken. When prevailing wind was from the SE operational noise [and dust] from the crushing circuit was an issue at times. On a few occasions crushing was reduced or suspended to limit issues with our neighbour to the NW of the project site.

There have been no noise issues since the site went on to care and maintenance.

#### **1.8.2.1 Visual, stray light**

Nil

## **1.9 Aboriginal heritage**

Nil

## **1.10 Natural heritage**

The site encloses an area of previous mining heritage. The heritage is restricted to foot traffic only with no incidents to report.

## **1.11 Spontaneous combustion**

Nil

## **1.12 Bushfire**

Nil

## **1.13 Mine subsidence**

Some minor subsidence has been evident within the open pit after some blast events in the area of historic workings. This has aided the void management requirement with both blasting and mining. No incidents resulted from the subsidence.

Since going onto care and maintenance there has been only minor fretting away from the pit crest.

## **1.14 Hydrocarbon contamination**

Nil

**1.15 Methane drainage/ventilation**  
Nil

**1.16 Public safety**  
No incidents

**1.17 Other issues and risks**  
No incidents.