

Amendment Notice 1

Licence Number	L9155/2018/1
Licence Holder ACN	Avoca Mining Pty Ltd 108 547 217
File Number:	DER2018/001153
Premises	Higginsville Gold Operations (HGO) Shire of Coolgardie
	Legal description – M15/351, M15/289, M15/225, M15/642, M15/348, M15/31, M15/786, M15/506, M15/507, M15/620, M15/629, M15/639, M15/640, M15/580, M15/581, M15/597, L15/225, L15/288, L15/302, G15/19, G15/23 M15/528, M15/231, M15/748, M15/512, M15/352, M15/610, M15/375, M15/338, M15/1790, M15/1814, L15/282 and L15/347

Date of Amendment 04/01/2019

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* (EP Act) as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Date signed: 4 January 2019

Tim Gentle

Manager, Resource industries

an officer delegated under section 20 of the Environmental Protection Act 1986 (WA)

Definitions and interpretation

Definitions

In this Amendment Notice, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Amendment Notice	refers to this document
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EP Act	Environmental Protection Act 1986 (WA)
EP Regulations	Environmental Protection Regulations 1987 (WA)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
Licence Holder	Avoca Mining Pty Ltd
m³	cubic metres
Noise Regulations	Environmental Protection (Noise) Regulations 1997 (WA)
Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report.

Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

The following guidance statements have informed the decision made on this amendment:

- Guidance Statement: Regulatory Principles (July 2015)
- Guidance Statement: Setting Conditions (October 2015)
- Guidance Statement: Land Use Planning (February 2017)
- Guidance Statement: Decision Making (February 2017)
- Guidance Statement: Risk Assessment (February 2017)
- Guidance Statement: Environmental Siting (November 2016)

1.1 Amendment description

The Licence Holder has applied to amend L9155/2018/1 to:

- Update the listed tenements within the Prescribed Premises boundary;
- Add groundwater monitoring bores for the existing Aphrodite In-pit TSF to the Licence;
- Update the parameters for analysis of groundwater quality;
- Construct pipeline and discharge tailings to the Fairplay East Pit;
- Construct a new seepage recovery pond at TSF 3 and 4;
- Construct a pipeline to discharge mine dewater from Baloo mine pit to Lake Cowan; and
- Include the existing putrescible landfill on the Licence (previously authorised by under registration R1920/2007/1).

No changes to the existing prescribed premises category thresholds has been requested. Category 64 has been requested to be added to the Licence.

At this time DWER has requested further information in relation to the assessment for discharging mine dewater onto Lake Cowan and hence the assessment for mine dewatering will be subject to a separate assessment and amendment. The Prescribed Premises boundary will be updated as part of the that assessment.

1.1.1 Fairplay East In-pit TSF

The Licence Holder proposes to utilise the Fairplay East Pit as an In-pit Tailings Storage Facility. Fairplay East In-pit TSF (FPTSF) is located approximately 1.6 km south of the Higginsville plant and is a previously mined open-cut pit. It is estimated a total of 1.0 Mt of tailings will be stored in the proposed FPTSF, based on a settled tailings dry density of approximately 1.5 t/m³. This corresponds with a monthly deposition of 108,333 tonnes (1.3 Mtpa) for approximately 9.2 months.

Tailings deposition into the FPTSF will be into the western end of the pit. Water liberated from the tailings slurry will be recovered by centrifugal pumps at the eastern end of the pit. Initially, water will be decanted at the northern end of the pit, followed by pumping from the eastern pit access ramp. Towards the end of the life of the FPTSF water will be recovered from the south-east corner of the pit.

Clearing for the tailings pipeline will be minimal as the pipeline for the current Aphrodite In-pit

TSF runs adjacent to the Fairplay East Pit. The pipeline to direct tailings to Fairplay East and to return decant to the plant will feed into the existing Aphrodite In-pit TSF tailings discharge/return pipes. Construction of the pipeline will also include a 10 m x 10 m x 1.5 m scour sump. The location of the FPTSF is shown in Figure 4 following.

Background groundwater standing water levels in the area of Fairplay East Pit are at 262 mAHD (approximately 41 mbgl) with the immediate area having a drawdown associated with previous open pit mining. The groundwater is hypersaline. A hydrogeological report on the proposal by Rockwater (2018) has recommended three locations for groundwater monitoring bores surrounding the Fairplay East Pit.

Rockwater (2018) conducted permeability tests using the existing Aphrodite TSF monitoring bores to develop a groundwater model for the extent of seepage expected from Fairplay East In-pit TSF. Seepage was predicted at the end of tailings deposition (peak seepage). The model determined that the most transmissive rock is along the quartz veins associated with the Poseidon Fault which runs north –south through the pit. The remaining bedrock is not as permeable. The only impacts associated with seepage are expected with seepage through to the adjacent Fairplay Pit. Below shows the groundwater contours associated with seepage from the Fairplay East In-pit TSF at the end of tailings deposition. The locations of the proposed monitoring bores (FPEMB1, FPEMB2, FPEMB3) are also shown.



Figure 1: Modelled groundwater levels at Fairplay East Pit following tailings deposition to 297mAHD (approximately 2mbgl) (Rockwater 2018)

Geochemical testing of the tailings produced at Higginsville indicates a relatively high level of sulphides and arsenic in the tailings. However, due to a high negative average value for the Net Acid Producing Potential (NAPP), the tailings are unlikely to be acid forming and therefore there is only a low risk of metals leaching from the tailings. The alkalinity of the tailings is also relatively high (averaging 8 pH).

The Licence Holder has developed a Tailings Storage Facility Operations Manual, to describe the procedures for the operation and monitoring of tailings deposition. This manual involves deposition procedures, pipelines' monitoring for flow, TSFs and groundwater and emergency action plans.

New infrastructure to be installed are tailings and return water pipelines from Fairplay East, which will tie into the existing pipelines to and from Aphrodite In-pit TSF, decant pumps and a catchment sump to provide emergency containment in the event of a pipeline failure (refer Figure 4, following, with new pipeline shown in aqua). Monitoring bores will be installed at three locations around the pit to monitor groundwater for tailings seepage impacts from the deposition of tailings into FPTSF.

The pipelines will be located within a bunded corridor as shown in Figure 2 below.



Figure 2: Cross-section showing the bunding arrangement for the pipeline corridor (excerpt from Drawing no 754-PERGE219368-02 Coffey 2018)

The catchment sump will be constructed in accord with the proposed design as shown in Figure 3 below.



Figure 3: Pipeline catchment sump design (excerpt from Drawing no 754-PERGE219368-02 Coffey 2018)



Figure 4: Proposed Fairplay East In-pit TSF with pipeline corridor and proposed monitoring bores shown (Excerpt from Drawing no 754-PERGE219368-01 Coffey 2018)

1.1.2 Seepage Recovery pond

The Licence Holder has proposed to construct an additional seepage pond at the toe of the existing above ground TSF (active cells being TSF 3 and 4), directly adjacent to the existing seepage pond to the south of the TSF. The new pond will have the same dimensions as the existing pond ($25m \times 50 m \times 2m$) and be lined with fully welded 1.5mm HDPE (high density polyethylene). The construction of this pond will assist in managing the seepage from the TSF. The location of the proposed pond is shown in Figure 5 below.

At the current pumping rate, the seepage recovery pond takes approximately one week to reach 75% capacity with all bores and pumps running. Daily inspections for all pumps, genset (for refuelling), intercept trenches and the seepage recovery pond are completed. Any necessary repair works are completed as soon as they are identified. If absolutely necessary, pumps used to pump water from the recovery bores and intercept trench (toe drain) to the seepage recovery pond can be turned off to ensure the seepage recovery pond does not overtop. This can be done as the seepage recovery pond <u>is not</u> gravity feed. As a further contingency, there is a spare pump available that can be installed in the event of an extended maintenance issue to ensure that an overtopping event does not occur and seepage from the TSF can still be recovered.

When the capacity of the seepage recovery pond reaches 50% capacity, a pump is started manually, which sends water from the seepage recovery pond directly to the mill process water ponds. The water level in the seepage recovery pond is reduced to 25% of its capacity. With the 27 kW pumping set up, the entire seepage recovery pond can be emptied within in a 48 hour period, whilst water is still being pumped into the pond. Given the above, the risk of overtopping is low.



Figure 5: Proposed additional seepage recovery pond

1.1.3 Additional Monitoring Bores

Groundwater monitoring bores servicing the Aphrodite In-pit TSF will be added to the licence to reflect the previous Licence amendment approving the discharges. No additional risk assessment will be required as the requirement to monitor the bores was part of the original assessment.

During the course of the assessment the Licence Holder notified DWER that monitoring bore HBM2 (located near the above ground TSF) had collapsed and was unable to be used for sampling. HBM9 has been proposed as a substitute, being located 20m to the south of HBM2. Refer to Figure 6 below.

1.1.4 Modification to monitoring parameters

The Licence Holder has also requested a change to the water quality parameters for the monitoring of dewater discharge and ambient groundwater. Inclusion of bicarbonate, carbonate, hardness and remove strontium, tin, thallium, vanadium.

The Licence Holder also requested that the monitoring requirements apply during the period of operations only.



Figure 6: Proposed groundwater monitoring bores for TSF 3 and 4

Amendment history

Table 3 provides the amendment history for L9155/2018/1 and its previous Licence L8146/2007/2.

Table 3: Licence amendments

Instrument	Issued	Amendment
W4688/2010/1	23 July 2010	Category 6 dewatering works approval from Chalice Pit to Aphrodite Pit.
L8146/2007/2	19 October 2010	Licence amendment
W4759/2010/1	5 November 2010	Category 6 dewatering works approval from Chalice Pit to Chalice West Lake.
L8146/2007/2	22 September 2011	Licence amendment
W5198/2012/1	9 October 2012	Category 5 works approval for TSF lifts for cells 3 and 4
L8146/2007/3	23 May 2013	Licence re-issue
L8146/2007/3	13 November 2014	Licence amendment to allow for mine dewatering to be discharged into Chalice West Lake
L8146/2007/3	11/06/2015	Licence amendment to include new tenements to prescribed boundary and Challenge pit dewatering operation.
L8146/2007/3	21/04/2016	Licence amendment for TSF3 and TSF4 lifts from RL 1312.5 m to RL 1315m.
L9155/2018/1	21/09/2018	New licence issued – previous licence ceased.
L9155/2018/1	21/12/2018	Amendment Notice to include the Fairplay East Pit as a Tailings Storage Facility, construct a new seepage pond at the TSF and include the current monitoring bores at the Aphrodite in-pit TSF. Add category 64 to the Licence.

Location and receptors

Table 4 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

 Table 4: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises			
Widgiemooltha community	Approximately 30 km north west of the Higginsville operations			
Norseman Town site	Approximately 50 km south of the Higginsville operations			

Table 5 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

 Table 5: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises			
Binaronca Rock Nature Reserve	Approximately 4.5 km north west of the Higginsville operations.			

Risk Assessment Methodology

The risk assessment following utilises the risk rating matrix as shown in Table 6, recently updated in accord with DWER's *Guidance Statement: Risk Assessments (November 2016)* (DER 2016a). The risk criteria used in the matrix below is further defined in Table 7.

Table	2:	Risk	Rating	Matrix
Table	2:	Risk	Rating	Matri

Likelihood	Consequence								
	Slight	Minor	Moderate	Major	Severe				
Almost Certain	Medium	High	High	Extreme	Extreme				
Likely	Medium	Medium	High	High	Extreme				
Possible	Low	Medium	Medium	High	Extreme				
Unlikely	Low	Medium	Medium	Medium	High				
Rare	Low	Low	Medium	Medium	High				

Consequen	ce	Likelihood		
The following	ng criteria will be used to determine the consequences of a risk eve	nt occurring:	The followin likelihood o	ng criteria will be used to determine the of the risk event occurring.
	Environment	Public Health* and Amenity (such as air and water quality, noise, and odour)		
Severe	 on-site impacts: catastrophic off-site impacts local scale: high level or above off-site impacts wider scale: mid level or above Mid to long term or permanent impact to an area of high conservation value or special significance^ Specific Consequence Criteria (for environment) are significantly exceeded 	 Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity 	Almost Certain	The risk event is expected to occur in most circumstances
Major	 on-site impacts: high level off-site impacts local scale: mid level off-site impacts wider scale: low level Short term impact to an area of high conservation value or special significance^ Specific Consequence Criteria (for environment) are exceeded 	 Adverse health effects: mid level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity 	Likely	The risk event will probably occur in most circumstances
Moderate	 on-site impacts: mid level off-site impacts local scale: low level off-site impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	 Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid level impact to amenity 	Possible	The risk event could occur at some time
Minor	 on-site impacts: low level off-site impacts local scale: minimal off-site impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	 Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity 	Unlikely	The risk event will probably not occur in most circumstances.
Slight	on-site impact: minimal Specific Consequence Criteria (for environment) met	Local scale: minimal impacts to amenity Specific Consequence Criteria (for public health) criteria met	Rare	The risk event may only occur in exceptional circumstances

.Table 3: Risk criteria definitions (taken from DWER's Guidance Statement: Risk Assessments)

^ Determination of areas of high conservation value or special significance should be informed by the Guidance Statement: Environmental Siting

* In applying public health criteria, DER may have regard to the Department of Health's, Health Risk Assessment (Scoping) Guidelines

"on-site" means within the prescribed premises boundary

Risk assessment

Tables 8 and 9 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Risk Event					0				
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts	rating	rating	Risk	Reasoning
	Construction of tailings and return water nipeline for	Noise	No residences in proximity (nearest is 30km).		Health and amenity impacts	N/A	N/A	N/A	Dust and Noise emissions for
Category 5 Processing or beneficiation cf matallia beneficiation cf matallia brock category 5 Processing or beneficiation cf matallia cf m	Fairplay East pit. Installation of pumping and discharge infrastructure at Fairplay East in- pit TSF.	Dust	No residences in proximity (nearest is 30km), vegetation adjacent to pipeline route.	Air / wind dispersion	Health and amenity impacts	N/A	N/A	N/A	pipeline construction will be short term during construction and limited to vehicle movements and minor earthworks. No receptors.
and non- metallic ores Construction of a seepage recovery pond at the above ground TSF.	Noise	No residences in proximity (nearest is 30km).	st is	Health and amenity impacts	N/A	N/A	N/A	Dust and Noise emissions for the construction of the seepage recovery pond will	
	recovery pond at the above ground TSF.	Dust	No residences in proximity (nearest is 30km), vegetation adjacent to pipeline route.	Air / wind dispersion	Health and amenity impacts	N/A	N/A	N/A	be short term during construction and limited to vehicle movements and minor earthworks. No receptors.

Table 9: Risk assessment for proposed amendments during operation

Risk Event					Component	Likelikeed			
Source//	Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts	rating	rating	Risk	Reasoning
Category 5 Processing or beneficiation of metallic and non-	Tailings deposition into Fairplay East pit.	Mounding of groundwater from tailings seepage	Adjacent native vegetation	Rising groundwater bringing hypersaline groundwater in contact with plant	Hypersaline groundwater inundating plant roots causing plant death	Moderate	Possible	Medium	Groundwater levels in the vicinity of the existing above ground TSF have risen due to tailings seepage from poor management of tailings deposition. However the duration of operation of the

metallic ores				roots					Fairplay pit is relatively short
									(9 months).and groundwater
									modelling has indicated that
									any seepage from the pit will
									reach background standing
									water levels within 400m (~41
									mbal) with the exception of
									the seenage within the
									Desoidon Fault (north south)
									Monitoring boros boyo boon
									installed within the foult to
									provide early warning of rising
									groundwater levels. Refer
									previous Figure 1 for bore
									locations. If necessary these
									bores can be converted into
									recovery bores.
									Management of the TSF will
									be in accord with the TSF
									Operating Manual is
									important, daily checks of the
									size of supernatant pond and
									ensuring the water balance
									over the TSF is managed (le
									water return is maximised).
									Pipeline located within bunded
									corridor (Coffey 2018). An
									emergency catchment sump
									will also be installed to be
									provide approximately 150m ³
									of tailings/return water storage
									(equivalent to half hour of
					Alkalina salina				pumping) in the event of a
					Alkaline Saline,				pipeline failure. The control
					toilingo or colino				system for the pipelines will
	Tailings and	Release of	A diagont nativo						utilise flowmeters at either end
	tailings return	tailings or tailings	Adjacent native	Pipeline	return tallings	Minor	Dessible	Madium	to allow detection of a
	water pipeline	decant water		failure	water causing	WINO	Possible	wealum	potential pipeline failure
	transport	(return water)	Soli contamination		vegetation death				(Coffey 2018). Given these
		·			or poor growth or				controls, it is unlikely that a
					SOIL				large uncontained spill to
					contamination				ground will occur.
									The TSF Operations Manual
									also requires daily checks of
									the pipeline to be completed
									(Coffey 2018) These controls
									will be also required by
									conditions in the amended
									Licence

	Operation of the seepage recovery storage pond	Release of seepage	Adjacent native vegetation Soil contamination	Overtopping of the pond due to pumping failure or freeboard not monitored	Saline seepage released to native vegetation in the immediate vicinity of the pond (to the south or east)	Minor	Possible	Medium	A pump failure could result in the pond overtopping as the seepage to the pond is gravity fed from the toe drains surrounding TSF 4. Low flow indication is on the pumping system allowing process control to respond. Daily checks of the toe drain sumps and seepage recovery bores are conducted.
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Decision

The deposition of tailings to Fairplay East In-pit TSF and installation of associated infrastructure is approved. The installation and operation of the additional seepage recovery pond at the above ground TSF is approved. The change to the monitoring bores at the existing above ground TSF is approved. The conversion of the landfill to category 64 is approved. The modification of water quality parameters is approved in part; strontium, thallium and vanadium will be retained in the monitoring suite. Bicarbonate and carbonate will be added.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 21 December 2018 and waived the remaining consultation period. No comments were received from the Licence Holder.

Amendment

1. The Prescribed premises category definitions table is amended by the deletion of the text in strikeout and the insertion of the red text in underline shown below:

Category number	Category description	Category production or design capacity	Approved Premises production or design capacity
05	Processing or beneficiation of metallic or	50 000 tonnes or	1 500 000 tonnes
	non-metallic ore	more per year	per year
06	Mine dewatering	50 000 tonnes or	1 900 000 tonnes
		more per year	per year
54	Sewage facility	100 cubic metres	No more than 200
		or more per day	cubic metres per
			day
<u>64</u>	Class I or II putrescible landfill	20 tonnes or more	20 tonnes per
		per year	annum

2. Table 1.2.2 is amended by the insertion of red text in underline below:

Table 1.2.2: Containment infrastructure								
Containment cell or	Discharge	Infrastructure requirements						
dam number(s)								
Above ground TSF	Tailings	Lined with at least 0.5m of clay with a permeability of <10 ⁻⁷ m/s or equivalent						
Aphrodite In-pit TSF	<u>Tailings</u>							
Fairplay East In-pit TSF	<u>Tailings</u>	1						
Decant Water Pond	Decant water	Lined with at least 0.5m of clay with a permeability of <10 ⁻⁷ m/s or equivalent						

- 3. Condition 1.2.5 and Table 1.2.5 of the Licence are amended by the deletion of text in strikethrough and the insertion of red text in underline as shown below:
- 1.2.5 The Licensee shall construct the works to raise TSFs 3 and 4 in Column 1 in accordance with the documentation detailed in requirements detailed in Column 2 and to the plans or locations referenced in Column 3 of Table 1.2.5:

Table 1.2.5: Construction requirements ⁴							
Document	Parts	Date of document					
Metals X Limited, Higginsville Gold Operations, Works- Approval Tailings Storage- Facilities 3 & 4 Additional- Embankment Raising- RL1312.5m — RL1315m,- Coffey Geotechnics Pty- Limited	All, including drawings and appendices	29 February 2016					
Column 1	Column 2	Column 3					
Infrastructure/Equipment	Requirements (design and construction)	Site plan reference					
Tailings discharge and return water pipelines to and from existing Aphrodite TSF pipelines to the Fairplay East in-pit TSF	 Located within a bunded corridor. Flowmeters installed on pipelines at the processing plant and at the discharge point with telemetry into the control system. 	Bunding as per Drawing No. 754- PERGE219368-02 (included in this amendment notice as Figure 2.) Pipelines to be located as per 754- PERGE219368-01 (included in this amendment notice as Figure 3.)					
Pipeline catchment sump (scour pit)	<u>Construct an earthen catchment</u> <u>sump of dimensions 10m x 10m x</u> <u>1.5m within the pipeline corridor.</u>	Indicative location as per drawing 754- PERGE219368-01 (included in this amendment notice as Figure 3.)					
Groundwater monitoring bores	Installation of monitoring bores FPEMB1, FBEMB2 and FBEMB3 to depth of 60m from surface.	Indicative locations as per drawing 754- PERGE219368-01 (included in this amendment notice as Figure 3.)					
TSF Seepage Recovery Pond	• Install a pond of dimensions 25m x 50 m x 2m, lined with 1.5mm HDPE.	Location as per Figure 5 of this Amendment Notice					

Note 1: Where the details and commitment of the documents listed in condition 1.2.5 are inconsistent with any other condition of this licence, the conditions of this licence shall prevail.

4. The Licence is amended by the insertion of new condition 1.2.6 shown below:

1.2.6The Licensee must not depart from the requirements specified in Table 1.2.5 except:(a)Where such departures are minor in nature and do not materially change or

 (b) <u>Affect the infrastructure; and</u> (b) <u>Where such departure improves the functionality of the infrastructure and</u> <u>does not increase the risks to public health, public amenity or the</u> environment.

If condition 1.2.6(b) applies, then the Licensee must provide the CEO with a list of departures and demonstrate that these have not increased the risk to public health, public amenity or the environment.

5. Table 3.3.1 of the Licence is amended by the insertion of the red text in underline shown below:

Table 3.3.1: Monitoring of emissions to land							
Emission	Parameter ¹	Units	Limit	Reference	Frequency		
point				period			
reference							
L1	Biochemical Oxygen Demand (BOD)	mg/L	-	Spot sample	Annually		
	Total Suspended Solids (TSS)	mg/L	-				
	Total Nitrogen (TN)	mg/L					
	Total Phosphorus	mg/L					
	Turbidity	NTU	-				
	Chlorine Residual	mg/l	-				
	рН		-				
	E.coli	cfu per	-				
		100ml					
G1 & G2	SWL	mbgl	4	Spot	Monthly		
	рН		-	sample			
	TDS	mg/L	-				
	Conductivity	mS/cm	-				
	Aluminium, arsenic, barium, boron,	mg/L	-	Spot	Quarterly		
	beryllium, <u>bicarbonate, carbonate,</u>			sample			
	cadmium, cobalt, chromium,						
	copper, iron, mercury, potassium,						
	magnesium, manganese,						
	molybdenum, sodium, nickel, lead,						
	selenium, silicon, <u>sulfate</u> , tin,						
	strontium, titanium, thallium,						
	vanadium, zinc.						
Note 1: pH an	d TDS may be measured in the field						

6. Table 3.4.1 of the Licence is amended by the deletion of the text in strikeout and the insertion of the red text in underline shown below:

Table 3.4.1: Process monitoring						
Monitoring point reference	Process description	Parameter	Units	Frequency	Method	
TSF <u>3 and 4</u> <u>Aphrodite In-</u> <u>Pit TSF</u> <u>Fairplay</u> <u>East In-pit</u> <u>TSF</u>	Tailings delivery to TSF	Volume, and mass of tailings deposited into the TSF (figures for wet and dry)	m ³ and tonnes	Monthly	None specified	
TSF <u>3 and 4</u> <u>Aphrodite In-</u> <u>pit TSF</u> <u>Fairplay</u> <u>East In-pit</u> <u>TSF</u>	TSF return water	Volumes of water recovered from the TSF	kL	Monthly	None specified	
TSF <u>3 and 4</u> <u>Aphrodite In-</u> <u>Pit TSF</u> <u>Fairplay</u> <u>East In-pit</u> <u>TSF</u>	Seepage recovery	Volume of seepage water recovered from the TSF	kL	Monthly	None specified	
G1 & G2	Dewatering from mines to	Volume of dewatering into Aphrodite Pits,	kL	Monthly	None specified	

Aphrodite <u>East</u>	and Poseidon North		
Pite and Poseidon North	Pit		
Pit			

7. Table 3.5.1 of the Licence is amended by the deletion of text in strikethrough and the insertion of the red text in underline shown below:

Table 3.5.1: Monitoring of amb	pient groundwa	ter qual	ity		
Monitoring point reference and location	Parameter ¹	Limit	Units	Averaging period	Frequency
Tailings outfall and decant	рН	-			Monthly when in
water	WAD CN	-	mg/L		operation.
	SWL	4	mbgl		Monthly <u>when in</u> <u>operation;</u> <u>Six monthly when</u> <u>in care and</u> <u>maintenance.</u>
	рН	-			Monthly when in
	TDS	-	mg/L		Six monthly when in care and maintenance
	Conductivity	-	mS/cm		
	WAD CN	0.5	mg/L		
Monitoring bores: <u>Above</u> <u>ground TSF</u> : HMB1, HMB2 , HMB3, HMB4, HMB5, HMB6,- and HMB7, HBM9. <u>Aphrodite In-pit TSF:</u> <u>APHMB1, APHMB2, APHMB3,</u> <u>APHMB4, APHMB5, APHMB6,</u> <u>MBS112, MBS 113.</u> <u>Fairplay East In-pit TSF FPEMB1, FPEMB2, FPEMB3.</u>	aluminium, arsenic, barium, boron, beryllium, bicarbonate, carbonate, carbonate, cadmium, cobalt, chromium, chloride, copper, iron, mercury, potassium, magnesium, manganese, molybdenum, nickel, lead, selenium, silicon, sulfate, sodium, strontium, thallium, vanadium, zinc	-	mg/L	Spot sample	Quarterly <u>when in</u> operation; <u>Annually when in</u> <u>care and</u> <u>maintenance</u>

Note 1: pH and TDS may be measured in the field

8. Table 4.2.1 of the Licence is amended by the deletion of the text in strikeout and the insertion of the red text in underline shown below:

Table 4.2.1: Annua	I Environmental Report	
Condition or	Parameter	Format or form ¹
table		
(ir relevant)		
-	Summary of any failure or maifunction of any pollution	None specified
	that have accurred during the appual pariod and any	
	action taken	
512112	Compliance	
<u>51412</u>		None specified
0.1.4 <u>4.1.5</u> Toblo 2.2.1.2.2.1	Aluminium araania barium baran barullium	None specified
1 abie 3.3.1 <u>3.2.1</u>	codmium, alsenic, banum, bolon, beryillum,	None specified
	potassium magnosium manganose molybdonum	
	sodium nickel lead selenium silicon tin strontium	
	titanium thallium vanadium zinc TDS aquatic	
	invertebrate fauna, and lake fringe monitoring- species	
	richness in quadrats	
Table 3 3 13 5 1	Biochemical Oxygen Demand (BOD)	None specified
	Total Suspended Solids (TSS)	
	Total Nitrogen (TN)	
	Total phosphorus, Turbidity, Chlorine Residual, pH.	
	<i>E.coli</i> , TDS, conductivity	
	Aluminium, arsenic, barium, boron, beryllium,	
	cadmium, cobalt, chromium, copper, iron, mercury,	
	potassium, magnesium, manganese, molybdenum,	
	sodium, nickel, lead, selenium, silicon, tin, strontium,	
	titanium, thallium, vanadium, zinc	
	volume discharged, SWL	
Table 3.7.1 <u>3.4.1</u>	Volume, and wet and dry mass of tailings deposited	Tabular
	into the TSF;	
	Volumes of water recovered from the TSF decant	
	pond;	
	Volume of seepage water recovered from the TSF;	
	and	
	Volume of dewatering discharge into Aphrodite pit.	
I able 3.8.1 <u>3.5.1</u>	pH, WAD CN, SWL, TDS, Conductivity, <u>metal(loid)s</u>	None specified
	and major ions	

9. The Licence is amended by the insertion of new Condition 4.2.3 below:

- 4.2.3 The Licensee must ensure the construction compliance document:
 - (a) Is certified by a qualified engineer stating that each item of infrastructure specified in Table 1.2.5 has been constructed in accordance with the conditions of the Licence;
 - (b) signed by a person authorised to represent the Licensee and contain the printed name and position of that person within the <u>company</u>; and
 - (c) Includes the groundwater bore logs for newly installed nested groundwater bores.



10. *The locations of the emission points defined in Tables 2.3.1 and 2.4.1* as in Schedule 1: Maps is removed and replaced with the map shown below:



11. The locations of monitoring points defined in Table 3.5.1 and as shown by the map in Schedule 1 is replaced by the three maps (Figures 7, 8 and 9) following below :

Figure 7: TSF3 and TSF4 Groundwater Monitoring Bores

Aphrodite In-pit TSF Monitoring Bore Locations



Figure 8: Aphrodite In-pit TSF Groundwater Monitoring Bores



Figure 9: Location of the Fairplay East In-pit TSF Groundwater Monitoring Bores

Appendix 1: Key documents

	Document title	In text ref	Availability
1	Licence L9155/2018/1 – Higginsville Gold Mine Operations	L9155/2018/1	accessed at <u>www.dwer.wa.gov.au</u>
2	Coffey (2018) Avoca Mining Ltd Higginsville Gold Operations Works Approval Application, Fairplay East In- Pit Tailings Storage Facility, 20 August 2018	Coffey 2018	DWER records A1722109
3	DER, July 2015. <i>Guidance Statement:</i> <i>Regulatory principles.</i> Department of Environment Regulation, Perth.	DER 2015a	
4	DER, November 2016. <i>Guidance</i> <i>Statement: Risk Assessments.</i> Department of Environment Regulation, Perth.	DER 2016b	accessed at <u>www.dwer.wa.gov.au</u>
5	DER, November 2016. <i>Guidance</i> <i>Statement: Decision Making.</i> Department of Environment Regulation, Perth.	DER 2016c	
6	Rockwater (2018) Fairplay East in-Pit TSF Results of Permeability Testing and Groundwater Modelling Report for Westgold Resources Ltd, August 2018	Rockwater 2018	DWER records A1722109