



<b>Licence Number</b>	L8314/2008/3
<b>Licence Holder</b>	Atlantic Vanadium Pty Ltd
<b>ACN</b>	610 583 090
<b>File Number:</b>	2012/008859
<b>Premises</b>	Windimurra Vanadium Project Mining Tenement M58/178, M58/279, and M58/280 Mount Magnet WA 6638
<b>Date of Amendment</b>	14 May 2018

## 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: 14 May 2018

**Louise Lavery**

**A/ Manager Licensing (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
ACN	Australian Company Number
AER	Annual Environment Report
Amendment Notice	refers to this document
AS 5667.1-1998	Australian/New Zealand Standard - Water quality—Sampling—Guidance of the Design of sampling programs, sampling techniques and the preservation and handling of samples
BOD	Biochemical Oxygen Demand
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means:  Director General Department Administering the <i>Environmental Protection Act 1986</i> Locked Bag 33 Cloisters Square PERTH WA 6850 <a href="mailto:info@dwer.wa.gov.au">info@dwer.wa.gov.au</a>
cfu	colony forming units
CS Act	<i>Contaminated Sites Act 2003 (WA)</i>
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
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>

EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
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
g/min	grams per minute
Licence Holder	Atlantic Vanadium Pty Ltd
m <sup>3</sup>	cubic metres
mbgl	metres below ground level
mg/L	milligrams per litre
mg/m <sup>3</sup>	milligrams per cubic metre
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
mtpa	million tonnes per annum
NATA	National Association of Testing Authorities
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
NMTSF	Non-magnetic Tailings Storage Facility
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 Amendment Notice applies, as specified at the front of this Notice Report.
Quarterly	4 inclusive periods from 1 January to 31 March, 1 April to 30 June, 1 July to 30 September, and 1 October to 31 December
Risk Event	as described in <i>Guidance Statement: Risk Assessment</i>
USEPA	United States (of America) Environmental Protection Agency

## 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.

This notice is limited only to an amendment for Category 5 and 85. No changes to the aspects of the original Licence relating to Category 7, 44, 64 and 84 have been requested by the Licence Holder.

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

- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessment (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

## Amendment description

In November 2017, Australia Vanadium Pty Ltd submitted an application to amend the list of parameters to be analysed in groundwater and also amend the groundwater monitoring bores required to be monitored by the Licence. Please refer to Figure 1 for the locations of the monitoring bores requested to remain on the Licence. Also, the Licence Holder has requested changes related to the wastewater discharge parameters to be monitored and to the frequency of air monitoring.

The site has been placed under care and maintenance since 2014 and in 2015, it was classified as “contaminated – remediation required” under the *Contaminated Sites Act 2003*.

Table 2 below outlines the requested (proposed) changes to the Licence.

**Table 2: Proposed changes**

Category	Proposed amendment N <sup>o</sup>	Current Specified	Description of proposed amendment
5	1	Condition 3.2.1 Note 2 Monitoring of point source emissions to air	Add: “In the event that the specified emission points are not in use throughout the reporting period, or are in use intermittently for periods of less than three hours at a time, monitoring is not required in the reporting period.”
5	2	Condition 3.1.1 Not specified	Water and groundwater sampling events to include collection and analysis of appropriate field quality control samples in accordance with AS 5667.1-1998
5	3	Condition 3.4.1 Sampling sites PSMB2, PSMB6, GATB1, GATB6, GATB3, GATB5, TSMB2, TSMB3, TSMB4, TSMB6, TSMB10	Remove
5	4	Condition 3.4.1 Sampling sites not listed in licence	Add sampling sites PSMB4, EP2MB5

Category	Proposed amendment N°	Current Specified	Description of proposed amendment
5	5	Condition 3.4.1 Analysis of Sodium oxalate	Change to soluble oxalate
5	6	Condition 3.4.1 Analysis by a NATA accredited laboratory	Oxalate to be tested by a reputable laboratory with Appropriate quality control measures
5	7	Condition 3.4.1 Oxalate analysis at all monitoring bores	Analyse only at select NMTSF sites (TSMB1, TSMB5, TSMB7, TSMB8, TSMB9, GATB4)
5	8	Condition 3.4.1 Analysis of lead and silicon	Remove
5	9	Condition 3.4.1 Analysis of various cations and anions	Add potential contaminants of concern, boron and selenium
5	10	Condition 3.4.1 Analysis of various cations and anions	Specify analysis of soluble metals and cations
85	11	Condition 3.3.1 Biochemical oxygen demand	Remove
85	12	Condition 3.3.1 Residual chlorine analysis by laboratory analysis unless indicated otherwise	Residual chlorine to be tested on site

## Groundwater monitoring changes

The Licence Holder proposes to remove monitoring bores GATB1 and GATB6, located to the south and southwest respectively, of the Non-Magnetic Tailings Storage Facility (NMTSF) containing Sodium Oxalate (contaminant of interest). The conceptual groundwater model for this area flows to the northwest and it is supported by the local and regional hydrogeology and standing water level monitoring. The geological profile logged during installation of these bores is almost entirely clay (low permeability). As groundwater flow direction is to the northwest, groundwater flow into bores GATB1 and GATB6 is from the south, which is predominantly undeveloped. Standing water level ranges from 20 to 40m below ground level.

Bore GATB5 is dry. Bores PSMB2, PSMB6, GATB3, TSMB2, TSMB3, TSMB4, TSMB6 and TSMB10 are up gradient of the waste stream storage area at the NMTSF and have shown no indication of contamination (AER 2016-2017).

Currently the Licence requires oxalate to be analysed by a NATA accredited laboratory. However, there are no laboratories in Australia that are NATA-accredited for oxalate or oxalic acid analysis. Therefore it is proposed that samples be sent to a reputable laboratory with appropriate quality control measures.

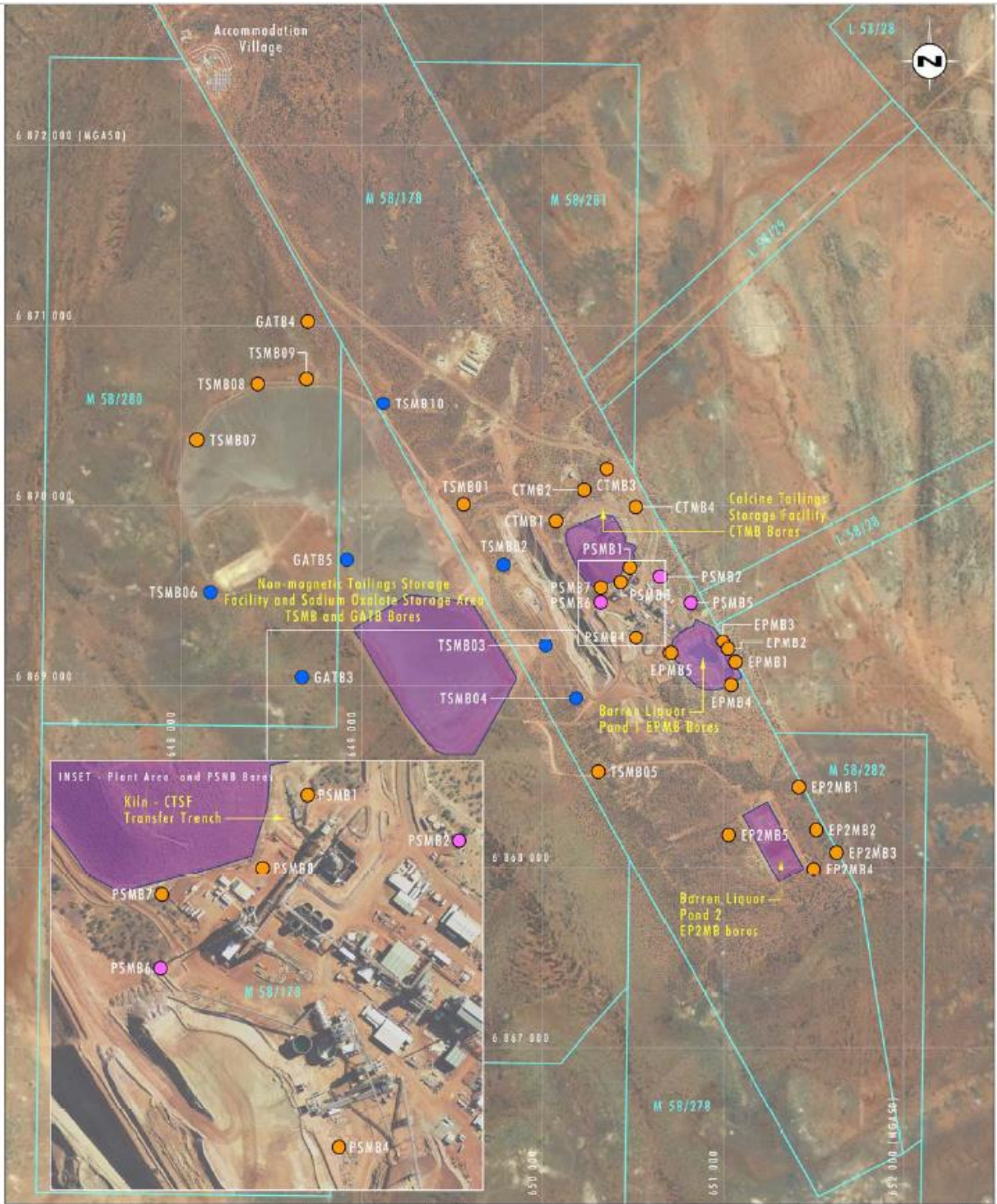
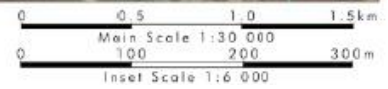


Image Source: Midwest Vanadium Pty Ltd, Google Earth (2005)



**Legend**

- Mining Tenement Boundary
- Tailings and Process Waste Storage Areas
- Waste Stream Monitoring Bores
- Historic Waste Stream Monitoring Bores (no longer operational)
- Historic Waste Stream Monitoring Bores (no longer required/relevant)

**Figure 1: Locations of Vanadium Windimurra’s process waste storage areas and groundwater monitoring bores.**

## Amendment history

Table 3 provides the amendment history for L8314/2008/3.

**Table 3:** Licence amendments

Instrument	Issued	Amendment
L8314/2008/3	25/08/2016	Transfer of ownership to Atlantic Vanadium Pty Ltd
L8314/2008/3	14/05/2018	Amendment Notice 1

## 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
<i>Challa Station</i>	<i>20 km NW of the premises</i>
<i>Mount Magnet town</i>	<i>80 km NW of premises</i>

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
<i>Water supply bore (Stag Well)</i>	<i>6.5 km NE from premises</i>
<i>Water supply bore (Brailia Well)</i>	<i>8.5 km N from premises</i>
<i>Water supply bore (Sandie Well)</i>	<i>9 km SE from premises</i>
<i>Water supply bore (Garden Well)</i>	<i>10 km N from premises</i>
<i>Water supply bore (Challa Station)</i>	<i>20 km NE from premises</i>
<i>Threatened / Priority Fauna</i>	<i>1.5km SE from the premises</i>
<i>Threatened / Priority Flora</i>	<i>1km SE from the premises</i> <i>4km NW from premises</i>

## Risk assessment

Table 6 below describes 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.

**Table 6: Risk assessment for proposed amendments during operation**

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
<b>Cat 5</b> <i>Processing or beneficiation of metallic or non-metallic ore</i>	<i>Operate intermittently ore processing facility</i>	<i>Dust</i>	<i>Windimurra Homestead 3km SE Challa Station 20km NW Mount Magnet 80km NW</i>	<i>Air/ wind dispersion</i>	<i>Health and amenity</i>	<i>Moderate</i>	<i>Possible</i>	<i>Medium</i>	<i>The site has been under care and maintenance since 2014. Based on the last three Environmental reports, the processing plant has not been operational since February 2014.</i>
<b>Cat 5</b> <i>Processing or beneficiation of metallic or non-metallic ore</i>	<i>Tailings Storage Facility</i>	<i>Oxalate, metals and salts released via tailings seepage</i>	<i>Local groundwater system</i>	<i>Water diffusion/ seepage</i>	<i>Deteriorating groundwater quality; potential impact to third party pastoral bores</i>	<i>Major</i>	<i>Likely</i>	<i>High</i>	<i>Assessment detailed in Operational Risk Assessment: TSF</i>
<b>Cat 54</b> <i>Sewage Facility</i>	<i>Wastewater Treatment Facility</i>	<i>Wastewater discharge to land</i>	<i>Soil and vegetation</i>	<i>Discharge point</i>	<i>Health, soil and groundwater quality</i>	<i>Minor</i>	<i>Possible</i>	<i>Medium</i>	<i>The site has been in care and maintenance since 2014. The number of workers on site ranges from two to ten at any one time.</i>



## Operational Risk Assessment: TSF

The Sampling and Analysis Quality Plan report shows that the removal of boreholes PSMB2, PSMB6, GATB1, GATB3, GATB5, GATB6, TSMB2, TSMB3, TSMB4, TSMB6, TSMB10 from monitoring program seems unlikely to compromise the assessment of risks associated with potential groundwater contamination at the site, given current operating status under care and maintenance.

The information provided in the Oxalate Contamination Review, shows that any potential risks of groundwater contamination relating to soluble oxalate are related only to the ongoing management of sodium oxalate residues that were historically placed in the non-magnetic TSF. Therefore, future monitoring for soluble oxalate is best limited to the bores TSMB1, TSMB5, TSMB7, TSMB8, TSMB9 and GATB4 (Umwelt 2017).

Based on the information provided in the Sampling and Analysis Quality Plan, lead and silicon are not considered to be contaminants of concern for this site. The same report indicated that boron and selenium are contaminants of interest and therefore, should be included in the list of elements in the monitoring program.

Total metals and cations are relevant to contamination risk. The purpose of groundwater monitoring under the conditions of an operating licence is primarily to identify emissions to groundwater, so analysis of total metals and cations should be sufficient to highlight instances where metal concentrations become significantly elevated in relation to baseline/background levels. Therefore, assuming that existing data relating to baseline /background levels of metals and cations is based on the analysis of total metals and cations, the current condition should remain unchanged.

## Decision

### Groundwater

The overall changes in the sampling bores programme is of low risk and has been determined as not detrimental to the monitoring of ambient groundwater quality while the site is in care and maintenance.

Approval to change monitoring bore programme has been granted. The change from the sodium oxalate analysis to soluble oxalate anion is granted. The requested change in oxalate analysis to a reputable laboratory with appropriate quality control measures and demonstrated competency in the analysis of soluble oxalate is granted. Based on the high risk contaminants present in the TSF, the condition related to analysis of soluble metals and cations will remain.

### Power Station Air Monitoring

The change in frequency in monitoring of air emissions is considered low as the site has been in care and maintenance since 2014 and no processing is occurring. The change is granted for the care and maintenance period.

### Water and Groundwater Sampling

AS/NZS 5667.1:1998 section 5, recommends that quality control samples (controls, blanks and replicates) are collected as part of any sampling study. Condition 3.1.1 (a) requires that "all water samples are collected and preserved in accordance with AS/NZS 5667.1."

Therefore, quality control samples are already part of the condition. No additional changes are required.

### Wastewater monitoring

Free chlorine determination on site is considered low risk and approval to change the condition is granted. However, BOD will remain as a parameter to be analysed.

## Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 16 April 2018. Comments received from the Licence Holder have been considered by the Delegated Officer as shown in Appendix 2.

## Amendment

1. Condition 3.2.1 of the Licence is amended by the deletion of the text shown in strikethrough and the insertion of the red bold text shown in underline below:

3.2.1 The ~~Licencee~~ **Licence Holder** shall undertake the monitoring in Table 3.2.1 according to the specifications in that table.

Table 3.2.1: Monitoring of point source emissions to air				
Emission point reference	Parameter	Units <sup>1</sup>	Frequency <sup>2</sup>	Method
Rotary Kiln Stack	Sulfur dioxide	mg/m <sup>3</sup> g/min	Annually <b><u>when in operation</u></b>	USEPA Method 6
Rotary Kiln Stack, AMV Flash Dryer, Deammoniator Process Stack, V <sub>2</sub> O <sub>3</sub> Combusted Gas Stack	Nitrogen oxides	mg/m <sup>3</sup> g/min		USEPA Method 7E or 7D
Rotary Kiln Stack, Hot Chain Scrubber, AMV Flash Dryer, V <sub>2</sub> O <sub>3</sub> Reactor Process Gas Stack, Deammoniator Process Stack, V <sub>2</sub> O <sub>5</sub> Handling Bag House, Ferrovandium Furnace Bag House	Particulates	mg/m <sup>3</sup> g/min		USEPA Method 5
V <sub>2</sub> O <sub>3</sub> Reactor Process Gas Stack, Deammoniator Process Stack	Ammonia (NH <sub>3</sub> )	mg/m <sup>3</sup> g/min		USEPA Method 17
Rotary Kiln Stack, Hot Chain Scrubber, AMV Flash Dryer, V <sub>2</sub> O <sub>3</sub> Reactor Process Gas Stack, Deammoniator Process Stack, Ferrovandium Handling Bag House, V <sub>2</sub> O <sub>5</sub> Handling Bag House, Ferrovandium Furnace Bag House	Total Vanadium	mg/m <sup>3</sup> g/min		None specified

Note 1: All units are referenced to STP dry

Note 2: Monitoring shall be undertaken to reflect normal operating conditions and any limits or conditions on inputs or production. In the event that no emissions to air are generated from the emission points specified during the reporting period, monitoring is not required.

2. Condition 3.3.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the red bold text shown in underline below:

3.3.1 The Licensee Licence Holder shall undertake the monitoring in Table 3.3.1 according to the specifications in that table.

<b>Table 3.3.1: Monitoring of point source emissions to land</b>			
<b>Monitoring point reference</b>	<b>Parameter</b>	<b>Units</b>	<b>Frequency</b>
Discharge to WWTP irrigation area	Biochemical Oxygen Demand <sup>1</sup>	mg/L	Quarterly
	Residual chlorine <sup>2</sup>		
	Total Phosphorus		
	Total Nitrogen		
	Total Suspended Solids		
	Volumes of wastewater discharged to the environment	m <sup>3</sup> /day	Continuous

Note 1: Biochemical Oxygen Demand can be performed on site using field kit. Calibration and maintenance procedures of the instruments need to be included in the AER report to ensure validity and reliability of the instrument measurement.

Note 2: Residual chlorine test performed on site can be done using the DPD (diethyl paraphenylene diamine) liquid reagent. Calibration and maintenance procedures of the instruments need to be included in the AER report to ensure validity and reliability of the instrument measurement.

3. Condition 3.4.1 of the Licence is amended by the deletion of the text shown in strikethrough and the insertion of the red bold text shown in underline below:

3.4.1 The Licensee Licence Holder shall undertake the monitoring specified in Table 3.4.1.

<b>Table 3.4.1: Monitoring of ambient groundwater quality</b>				
<b>Monitoring point reference</b>	<b>Parameter</b>	<b>Units</b>	<b>Averaging period</b>	<b>Frequency</b>
PSMB1		-	Spot sample	Quarterly
<del>PSMB 2</del>	Standing Water Level	mbgl		
PSMB 4	pH <sup>1</sup>			
<del>PSMB6</del>	Aluminium Bicarbonate	mg/L		
PSMB7	Calcium			
PSMB8	Chloride			
EPMB1 to	Chromium			
EPMB5	Copper			
EP2MB1 to	Iron			
EP2MB4	<del>Lead</del>			
<b>EP2MB5</b>	Magnesium			
CTMB1 to	Nickel			
CTMB4	Potassium			
TSMB1	<del>Silicon</del>			
<del>TSMB2</del>	Sodium			

TSMB3	Sodium Oxalate			
TSMB4	Sulphate			
TSMB5	Vanadium			
TSMB6	Zinc			
TSMB7	<b><u>Boron</u></b>			
TSMB8	<b><u>Selenium</u></b>			
TSMB9				
TSMB10				
GATB1				
GATB3				
GATB4				
GATB5				
GATB6				
<b><u>TSMB1</u></b>	<b><u>Oxalate<sup>2</sup></u></b>	<b><u>mg/L</u></b>	<b><u>Spot sample</u></b>	<b><u>Quarterly</u></b>
<b><u>TSMB5</u></b>				
<b><u>TSMB7</u></b>				
<b><u>TSMB8</u></b>				
<b><u>TSMB9</u></b>				
<b><u>GATB4</u></b>				

**Note 1: Non-NATA accredited analysis permitted.**

**Note 2: Oxalate samples are to be analysed by a reputable laboratory with appropriate quality control measures and demonstrated competency in the analysis of soluble oxalate.**

## Appendix 1: Key documents

	Document title	In text ref	Availability
1	DWER (2018) <i>Windimurra Vanadium Project - change to ambient groundwater monitoring program</i> , dated 25 January 2018	DWER 2018	DWER internal record (A1604120)
2	Licence L8314/2008/3 – Windimurra Vanadium Project	L8314/2008/3	accessed at <a href="http://www.dwer.wa.gov.au">www.dwer.wa.gov.au</a>
3	Licence amendment application form submitted 27 November 2017	Application	DWER internal record (A1570006)
4	Sampling and Analysis Quality Plan - Windimurra Vanadium Project, December 2017	Sampling and Analysis Quality Plan	DWER internal records (A1584971)
5	Windimurra Vanadium Project - Annual Environmental Report 2016-2017	AER 2016-2017	
6	Umwelt (2017) <i>Atlantic Vanadium Pty Ltd Windamurra Vanadium Project Oxalate Contamination Review</i> , February 2017	Umwelt 2017	DWER internal record (A1420706)
7	DER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.		accessed at <a href="http://www.dwer.wa.gov.au">www.dwer.wa.gov.au</a>
8	DER, November 2016. <i>Guidance Statement: Environmental Siting</i> . Department of Environment Regulation, Perth.		
9	DER, February 2017. <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.		
10	DER, February 2017. <i>Guidance Statement: Land Use Planning</i> . Department of Environment Regulation, Perth.		

## Appendix 2: Summary of Licence Holder comments

The Licence Holder was provided with the draft Amendment Notice on 16 April 2018 for review and comment. The Licence Holder responded on 23 April waiving the remaining comment period.

Condition	Summary of Licence Holder comment	DWER response
Location and Receptors	Windimurra Homestead has been demolished and is no longer occupied.	Receptor removed from assessment
Table 3.3.1 - Monitoring point reference - E. coli	E. coli holding time is shorter than BOD; therefore, it is less practical to undertake the analysis	Keep BOD monitoring, but the analysis can be performed on site.
Table 3.3.1 - Monitoring point reference - Residual chlorine	Specify that the on-site assessment must be undertaken in accordance with the Department of Health WA accepted method using commercially available DPD (diethyl paraphenylene diamine) test kits, in accordance with manufacturer instructions.	DPD kit can be used on site for residual chlorine
Table 3.4.1 - Monitoring of ambient groundwater quality	PSMB4 should be added to the list of monitoring points	Table amended
Table 3.4.1 - Monitoring of ambient groundwater quality	analysis of copper to be removed from the parameters list	Copper is an important monitoring parameter and it will remain in the list of elements to be analysed.