Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 4

Licence Number	L8148/2006/4
Licence Holder	Koolan Iron Ore Pty Ltd
ACN	099 455 277
File Number	DER2014/000374
Premises	Koolan Iron Ore Mine and Port Facility Mining Tenements M04/416, M04/417 and L04/29 KOOLAN ISLAND (BUCCANEER ARCHIPELAGO) WA 6733
Date of Amendment	19 July 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* 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.

Alana Kidd
Digitally signed by Alana Kidd
Date: 2019.07.19 13:42:32 +08'00'

Alana Kidd

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
ACN	Australian Company Number
Amendment Notice	means an amendment granted under s.59 of the EP Act in accordance with the procedure set out in s.59B of the EP Act
Annual Period	means a 12 month period commencing from 1 January until 31 December in that year
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 *Environmental Protection Act 1986* Locked Bag 10 JOONDALUP WA 6919 info@dwer.wa.gov.au
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the *Public Sector Management Act 1994* 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	*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 Amendment
Licence Holder/ Licensee	Koolan Iron Ore Pty Ltd
NTU	Nephelometric Turbidity Unit
Prescribed Premises	has the same meaning given to that term under the EP Act

Term	Definition
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
TSS	Total Suspended Solids

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 Amendment Notice is limited only to an amendment to Amendment Notice 2. No other changes to the aspects of the original Licence or Amendment Notices 1 or 3 relating to Category 5, 6, 12, 54, 58, 64 and 73 activities have been requested by Koolan Iron Ore Pty Ltd (Licence Holder).

The following documents have informed the decision made on this amendment*:*

- *Guideline: Decision making* (June 2019);
- *Guidance Statement: Regulatory Principles* (July 2015);
- *Guidance Statement: Setting Conditions* (October 2015);
- *Guidance Statement: Risk Assessments* (February 2017); and
- *Guidance Statement: Environmental Siting* (November 2016).

Amendment description

On 9 May 2019, the Licence Holder submitted an application (Application, 2019) to amend the Koolan Iron Ore Mine and Port Facility (Premises) licence L8148/2006/4.

The Licence Holder has applied to revert back to Total Suspended Solids (TSS) with a limit of 20 mg/L for point source emissions to surface water. Under Amendment Notice 2, TSS was changed to turbidity (in-field sampling using a hand held nephelometer) with a limit of 7 Nephelometric Turbidity Unit (NTU).

Amendment history

Table 2 provides the amendment history for L8148/2006/4.

Table 2: Licence amendments

Instrument	Issued	Amendment
L8148/2006/4	12/06/2014	New Licence and conversion to new format
L8148/2006/4	18/06/2015	Licence amendment following Minister's appeal determination number 123 of 2014
L8148/2006/4	31/03/2016	Licence amendment to include Category 12 to allow for the crushing and screening of quartzite to produce aggregate for construction purposes, increase the Category 73 design capacity and make changes to the groundwater monitoring requirements. The Licence was also updated in accordance with the licence template and relevant guidance statements
L8148/2006/4	29/04/2016	Amendment of Licence expiry date
L8148/2006/4	19/05/2016	Licence amendment to change the approved production limits for each Licence category to the minimum threshold amount when a licence is required

Instrument	Issued	Amendment
L8148/2006/4	17/02/2017	Amendment Notice 1 Licence amendment to increase the throughput for Category 12
L8148/2006/4	18/10/2017	Amendment Notice 2 Licence amendment to increase the design capacity of Category 6 and 64
L8148/2006/4	12/09/2018	Amendment Notice 3 Licence amendment to increase the design capacity for Category 5, 58 and 73. Site coming out of care and maintenance, operations to resume.
L8148/2006/4	19/07/2019	Amendment Notice 4 Licence amendment to revert back to TSS with a limit of 20 mg/L for point source emissions to surface water.

Other approvals

The Licensee has provided the following information relating to other approvals as outlined in Table 3.

Table 2: Relevant approvals

Legislation	Number	Approval
Environment Protection and Biodiversity Conservation Act 1999	Referral EPBC 2016/7848	Referral for construction works on the renovated seawall and pit water, determined to be 'Not Controlled' in February 2017.
Part IV of the EP Act	Ministerial Statement 715	Koolan Island Iron Ore Mine and Port Facility requiring the Licence Holder to implement the following: Closure Plan; Marine Management Plan; Water Management Plan; Quarantine Management Plan; Contamination Plan; and Asbestos Management Plan. Change to proposal approved under section 45C of the EP Act was approved 13 April 2018 allowing for the reconstruction of a portion of engineered seawall; and dewatering of approximately 25 gigalitres of seawater from the inundated Main Pit.
	Marine Management Plan (v20)	Approved by the Environmental Protection Authority (EPA) in 2018 for management of potential direct and indirect effects of the proposal for partial reconstruction of the

Legislation	Number	Approval
		seawall and capital dewatering.
Mining Act 1978	Reg ID. 60751	Addendum to Koolan Island Iron Ore Mining Proposal Reg ID 5601, Koolan Island Iron Ore Mine and Port Facility – Seawall Construction and Mine Pit Dewatering on M04/416, M04/417 & L04/29, Mt Gibson Iron Limited, 19 September 2016.
	Reg ID. 56401	Koolan Island Iron Ore Mine and Port Facility – Mine Closure Plan (document ID: MGI-KIO-MCP version 4), Koolan Iron Ore Pty Ltd, 14 September 2015.

Decision

During this amendment the Licence Holder has requested that turbidity (in-field sampling using a hand held nephelometer) with a limit of 7 NTU be reverted back to TSS with a limit of 20 mg/L.

On 18 October 2017 Amendment Notice 2 was granted replacing TSS as the parameter to be analysed for point source emissions to surface water with turbidity NTU with a discharge limit of 7 NTU.

The Licence Holder has stated (Application, 2019) that the primary justification for the request to change water quality test parameters from TSS to turbidity (NTU) was to align the Licence with the *Marine Management Plan (v20)* approved under Ministerial Statement 715 (and as varied by the EPA in 2018) for the seawall reconstruction and capital dewatering phases of the project. Capital dewatering commenced on 1 August 2018 and has now concluded (2018 AER). *Marine Management Plan (v20)* is now redundant with the conclusion of associated activities.

The Licence Holder has now reverted back (April 2019) to the *Marine Management Plan (v19)* approved for mining operations by the EPA in 2015. *Marine Management Plan (v19)* states that TSS will be measured in accordance with Licence L8148/2006/4 and that during dewatering, monitoring will be conducted as per the requirements in Licence L8148/2006/4. Should TSS exceed 20 mg/L on any day, the event shall be reported as per the requirements of L8148/2006/4.

The second justification for the change was the lack of facilities on the Premises to undertake water sampling. During mining operations, dewatering discharge samples were tested by an independent third party laboratory located on Koolan Island (SGS Laboratories). TSS was measured in accordance with Schedule 3 of the Licence, which required the Licence Holder to undertake water analysis of samples for TSS using the document *Environmental Water Sampling: Determination of Total Suspended Solids (SOP 00016, version 2),* SGS Australia Pty Ltd, 7 February 2008. With the suspension of mining and pit dewatering in November 2014 no sampling was undertaken. In February 2016, the SGS Laboratory entered into care and maintenance. In March 2019, SGS Laboratory recommenced operations on Koolan Island and are now able to offer TSS sampling using the *Gravimetric Determination of Total Suspended Solids* procedure.

Existing Licence condition 2.2.3 has been updated via this Amendment Notice to change turbidity with a limit of 7 NTU to TSS with a limit of 20 mg/L for discharges to surface water. The provision to allow in-field analysis has also been removed.

Existing Licence condition 3.2.1 has been updated via this Amendment Notice to remove

turbidity and replace with TSS for monitoring of emissions to surface water. The provision to allow in-field analysis has also been removed.

Existing Licence conditions 4.2.1, 4.2.3 and 4.3.1 have been updated via this Amendment Notice to remove turbidity and replace with TSS as applicable. The forms associated with these conditions have also been updated where required to remove turbidity and replace with TSS.

The requirement to undertake water analysis of samples for TSS using the *Gravimetric Determination of Total Suspended Solids* procedure, has been applied to the Licence (Schedule 3) via this Amendment Notice.

Other amendments

During this amendment the following changes have also been made to the Licence:

- Definition for 'CEO' for the purposes of notification has been updated and the definition for 'NTU' deleted.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 9 July 2019 for review and comment. The Licence Holder responded on 17 July 2019 waivering the remaining comment period (Koolan, 2019).

Amendment

1. Definitions of the Licence are amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

'CEO' *for the purposes of notification means;*

Director General
Department Administering the Environmental Protection Act 1986
Locked Bag ***10*** ~~*33*~~ ~~*Cloisters Square*~~
JOONDALUP DC ~~*PERTH*~~ *WA* ***6919*** ~~*6850*~~
~~*Email:*~~ ***info@dwer.wa.gov.au*** ~~*info-der@dwer.wa.gov.au*~~*;*

~~*'NTU' means Nephelometric Turbidity Unit;*~~

2. Condition 2.2.3 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

2.2.3 The Licensee shall not cause or allow point source emissions to surface water greater than the limits listed in Table 2.2.2.

Table 2.2.2: Point source emission limits to surface water				
Emission point reference	***Parameter***	***Limit (including units)***	***Averaging period***	***Frequency***
W1 *W2* *W3* *W4*	*Total Recoverable Hydrocarbons*	*15 mg/L*	*Spot sample*	*Daily*
	Total Suspended Solids ~~*Turbidity*~~[1]	***20 mg/L*** ~~*7 NTU*~~		

~~*Note 1: In-field non-NATA accredited analysis permitted.*~~

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

3.2.1 The Licensee 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 surface water				
Monitoring point reference	***Parameter***	***Units***	***Frequency***	***Analytical Specifications***
M12	*Volumetric flow rate*	*m^3*	*Monthly*	*Flow meter*
M13 - M15	*Volumetric flow rate*	*m^3*	*Monthly*	*Estimate*
M12 - M15	***Total Suspended Solids*** ~~*Turbidity*~~[1]	***mg/L*** ~~*NTU*~~	*Daily (during discharge)*	***Analysis in premises onsite laboratory in accordance with laboratory procedure specified in Schedule 3*** ~~*Hand held nephelometer (calibrated as required by manufacturer's specifications)*~~
M12 - M15	*Total Recoverable Hydrocarbons*	*mg/L*	*Monthly*	*NATA Accredited Laboratory*

~~*Note 1: In-field non-NATA accredited analysis permitted.*~~

4. Condition 4.2.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

4.2.1 The Licensee shall submit to the CEO an Annual Environmental Report within 90 calendar days after the end of the Annual Period. The report shall contain the information listed in Table 4.2.1 in the format or form specified in that table.

Table 4.2.1: Annual Environmental Report		
Condition or table (if relevant)	***Parameter***	***Format or form[1]***
-	*Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the Annual Period and any action taken*	*None specified*
2.2.1	*Contingency dewatering discharge activities*	*CD1*
*Table**s** 2.2.2 and 2.3.2*	*Limit Exceedances*	*None specified*
Table 3.2.1	*Volumetric Flow Rate,* ***Total Suspended Solids*** ~~*Turbidity*~~ *and Total Recoverable Hydrocarbons*	*WR1*
Table 3.3.1	*Volumetric flow rate, Biochemical Oxygen Demand, Total Dissolved Solids, pH, Total Nitrogen, Total Phosphorus, E.coli, Total Recoverable Hydrocarbons*	*LR1*
Table 3.4.1	*Standing water level, pH, Electrical conductivity, Total Recoverable Hydrocarbons, Hardness (as equivalent $CaCO_3$), Total Alkalinity (as $CaCO_3$), Total Nitrogen, Total Phosphorus, Bicarbonate, Carbonate, Nitrate, Sulfate, Aluminium, Arsenic, Barium, Boron, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Sodium, Zinc*	*GR1*
4.1.3	*Compliance*	*Annual Audit Compliance Report*
4.1.4	*Complaints summary*	*None specified*
-	*Throughputs for each prescribed activity on the premises*	*None specified*

Note 1: Forms are in Schedule 2

5. Condition 4.2.3 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

4.2.3 The Licensee shall submit the information in Table 4.2.2 to the CEO according to the specifications in that table.

Table 4.2.2: Non-annual reporting requirements				
Condition or table (if relevant)	***Parameter***	***Reporting period***	***Reporting date (after end of the reporting period)***	***Format or form[1]***
Table 2.2.2	***Total Suspended Solids*** ~~*Turbidity*~~ *limit exceedances*	*Quarterly*	*28 calendar days*	*ET1*

Note 1: Forms are in Schedule 2

6. Condition 4.3.1 of the Licence is amended by the deletion of the text shown in strikethrough below and the insertion of the bold text shown in underline below:

4.3.1 The Licensee shall ensure that the parameters listed in Table 4.3.1 are notified to the CEO in accordance with the notification requirements of the table.

Table 4.3.1: Notification requirements			
Condition or table (if relevant)	***Parameter***	***Notification requirement[1]***	***Format or form[2]***
Table 1.3.1 Table 1.3.4 Table 2.2.2 Table 2.3.2	*Breach of any limit specified in the Licence (exempt parameter of* ***Total Suspended Solids*** ~~*Turbidity*~~ *from Table 2.2.2)*	*Part A: As soon as practicable but no later than 5pm of the next usual working day.* *Part B: As soon as practicable*	*N1*
2.3.2	*Contingency dewatering discharge*	*Within 24 hours of activation of a contingency dewatering discharge activity*	*CD1*
2.3.2	*Contingency dewatering discharge*	*Within 7 days of cessation of a contingency dewatering discharge activity*	*CD1*

Note 1: Notification requirements in the Licence shall not negate the requirement to comply with s72 of the Act
Note 2: Forms are in Schedule 2

7. Form WR1 in Schedule 2 of the Licence has been updated as per Attachment 1 of this Amendment Notice.

8. Form ET1 in Schedule 2 of the Licence has been updated as per Attachment 2 of this Amendment Notice.

9. Form CD1 in Schedule 1 of the Licence has been updated as per Attachment 3 of this Amendment Notice.

10. Schedule 3 (as shown in Attachment 4) has been included to the Licence via this Amendment Notice.

Attachment 1

Licence: L8148/2006/4 Licensee: Koolan Iron Ore Pty Ltd
Form: WR1 Period:
Name: Monitoring of point source emissions to surface water

Form WR1: Monitoring of point source emissions to surface water							
Emission point	**Parameter**	**Limit**	**Result[1]**	**Result[1]**	**Averaging period**	**Method**	**Sample date & times**
M12	Volumetric flow rate	-	m^3/day	m^3/month	Spot sample		
M13	Volumetric flow rate	-	m^3/day	m^3/month	Spot sample		
M14	Volumetric flow rate	-	m^3/day	m^3/month	Spot sample		
M15	Volumetric flow rate	-	m^3/day	m^3/month	Spot sample		
M12	Total Suspended Solids	20 mg/L	mg/L		Spot sample		
M13	Total Suspended Solids	20 mg/L	mg/L		Spot sample		
M14	Total Suspended Solids	20 mg/L	mg/L		Spot sample		
M15	Total Suspended Solids	20 mg/L	mg/L		Spot sample		
M12	Total Recoverable Hydrocarbons	15 mg/L	mg/L		Spot sample		
M13	Total Recoverable Hydrocarbons	15 mg/L	mg/L		Spot sample		
M14	Total Recoverable Hydrocarbons	15 mg/L	mg/L		Spot sample		
M15	Total Recoverable Hydrocarbons	15 mg/L	mg/L		Spot sample		

Signed on behalf of Koolan Iron Ore Pty Ltd: …….. Date: …….

Attachment 2

Licence:	L8148/2006/4	Licensee:	Koolan Iron Ore Pty Ltd
Form:	ET1	Period:	
Name:	Total Suspended Solids limit exceedances		

Form ET1: Total Suspended Solids limit exceedances
Please provide an analysis of the limit exceedances for the month, including but not limited to: (a) the emission point (b) the root cause analysis for the exceedances; (c) any common or contributory factors; (d) a description of remedial measures taken or planned to be taken, including those taken to prevent recurrence of the exceedances; (e) complaints received that may have been caused by this exceedance; and (f) for those exceedances that may have caused complaints, meteorological details: rainfall, temperature, wind speed and wind direction, humidity.

Signed on behalf of Koolan Iron Ore Pty Ltd: …….. Date: …….

Attachment 3

Licence: L8148/2006/4
Form: CD1
Name: Contingency Discharge Form

Licensee: Koolan Iron Ore Pty Ltd
Date of discharge:

Form CD1: Contingency Discharge					
Emission point	**Discharge Commencement Date & Time**	**Discharge Cessation Date & Time**	**Total Volume Discharged**	**Volumetric flow rate**	**Total Suspended Solids levels (average of daily analysis)**
			m^3	m^3/day	mg/L
			m^3	m^3/day	mg/L

1. Please provide details of the contingency discharge, including but not limited to:
   (a) Copies of daily results of Total Suspended Solids monitoring during discharge;
   (b) Other monitoring data as relevant (e.g. Visual / photographic monitoring)
   (c) Reason discharge required; and
   (d) Recorded rainfall (mm) onsite during discharge period.

Signed on behalf of Koolan Iron Ore Pty Ltd: …….. Date: …….

Attachment 4

Schedule 3: Gravimetric Determination of Total Suspended Solids

SGS	Minerals Geochemistry Global	Revision Doc Type Document Code Document Number Service Issued Date Review Date Approved by	0.0 Method G_PHY13V Testing 17/May/2019 17/May/2021 Russ Calow Stuart Fryer
Minerals	Gravimetric Determination of Total Suspended Solids		

Method Origin: This method has been developed at SGS Minerals.

File / Intranet Ref: https://sgs.sharepoint.com/sites/global-min-techgov/Tech%20Document%20Library/Geochem1/Forms/AllItems.aspx?viewpath=%2Fsites%2Fglobal-min-techgov%2FTech%20Document%20Library%2FGeochem1%2FForms%2FAllItems.aspx

Date	Revision	Description	Reviewed By	Authorized
17/May/2019	0.0	First Edition as Global Method	L. Marjanovic, E. Matthews	M. Caverly

1. SCOPE

Analyte	TSS (Total Suspended Solids)
Units	mg/L
Lower Report Limit	1
Upper Report Limit	10000
Limiting Repeatability (SLIM)	10%
Analysis Detection Limit (SLIM)	1
Statistical Detection Limit (SLIM)	2.5
Sample size	500mL to 1000mL
Matrix	Water and process solutions
Accreditation status	Refer to laboratory accreditation scope
Performance Study (PT/RR)	Internal RR, CALA

Note: * units for reporting are based on default settings and may be modified according to customer needs based on the information in section 12.

NOTE:
For process solutions less than 500mL can be used as long as the weight of the residue is more than 0.5mg.

2. SUMMARY

Total suspended solids (TSS) is the quantity of material suspended in a known volume of water that is trappable in a filter.

In this gravimetric method, it is determined by filtering the water sample, drying the residue, and reporting the weight of the dried residue as TSS.

3. RESPONSIBILITIES

The Laboratory Manager is responsible to ensure that all resources are available to meet the requirements of GQP-MIN-21 and OIMS. All Minerals Technicians are responsible for following the procedure as written.

4. OPERATIONAL INTEGRITY

This procedure raises several potential safety and health hazards. As part of the work order review and before any testing or preparation activities are performed, a lab specific risk assessment must be included in the work instructions. These documents must consider all relevant local laws, client / site safety rules and programs. They must comply with SGS OIMS Standards and the SGS Rules for Life. The following hazards are referenced in the Global Risk Assessment and must be reviewed by operational managers before job / work order commences. Supervisors must assess the risks before commencing any testing procedures and inform their line managers of any deviations or new hazards that have been identified.

All staff must have appropriate PPE (personal protective equipment) in accordance with OIMS Standard "L2- 313 PPE", Local / Site Regulations and SGS Rules for Life / SOP's. This must include Lab Coats (preferably flame retardant), safety shoes, safety glasses, and where applicable respiratory protection.

4.1 Hazards

- Electrical shock – equipment
- Material disposal – waste regulations (e.g. all hazardous by-products)
- Slips, trips and falls – poor housekeeping
- Thermal Burns - hot, molten equipment and materials

4.2 Safety Requirements:

- Loose clothing, long hair, dangling accessories, jewelry or other similar items that are likely to be hazardous to the health or safety of an employee in a work place shall not be worn unless they are so tied, covered or otherwise secured as to prevent the hazard. Jewelry must not be worn when working around machinery that may cause entanglement.
- Perform and record any maintenance checks prior to starting equipment. The Lockout/Tagout procedure must be followed prior to any maintenance of the electrical equipment, as per HSE.
- Be aware of and take any additional precautions and containment required due to sample type (e.g. asbestos, NORM). If the work area is temporarily designated for work requiring containment, ensure containment designation is clearly posted. Specific training on the hazards and handling of silica, asbestos, NORM and arsenic must be completed prior to working with samples identified as such. Consult your Supervisor for details and training materials.
- Ensure all ventilation/fume hoods are fully operational. Fume hood draw is critical for safety, and the draw must be kept within specified values to ensure no fumes escape. Extraction systems all indicate their function differently (lights, measurement, readout). Ensure you are aware of the method for your type that indicates it is functioning properly and always check before beginning work. Generally, sashes should be kept closed while processing a sample requiring a fume hood. If fumes escape the fume hood at any time, shut the sash, step away and allow the samples to react. If fumes still escape, stop work and report to the area Supervisor. The fume hood draw is also critical to maintaining consistent analytical recovery.
- Glassware must be inspected prior to use for chipping and cracking and discarded if compromised. Cut resistant gloves are required while cleaning or washing lab glassware, handling glass pipettes, manipulating connections between lab glassware components or handling damaged lab glassware, unless a risk-assessment has been performed to determine this is unnecessary for that step.

- Disposal of solution/solid material will only be done in a designated waste container specific for the matrix (acidic, basic, cyanide, organic, NORM, etc.). Care must be taken not to mix incompatible material.
- Wear approved PPE for the specific work area:
  - **Weighing** - must wear long pants and work shirt or coveralls or lab coat; nitrile gloves when handling samples; safety glasses, protective footwear. Respirators with appropriate cartridges must be worn when working with hazardous substances. Employees are required to complete a training program and fit test prior to working with a hazardous substance that requires a respirator. Cut resistant gloves must be worn when using safety blades to open boxes or packages.

STOP WARNING

The MSDS shall have been read and understood prior to handling any reagent.

Always follow the SGS Rules for LIFE

5. DEFINITIONS

Terminology	Definition
DI water	Deionized water, but may also refer to distilled or reverse osmosis water.
SLIM	SGS Laboratory Information Management System
Sub-sample	A sample drawn from a larger sample in order to produce a representative sample aliquot for preparation and measurement.
CAR	Corrective Action Report
CRM	Certified Reference Material. A reference material, accompanied by documentation issued by an authoritative body and providing one or more specified property value with uncertainty and traceability, using valid procedures.
IHRM	In-house Reference Material. A material, sufficiently homogeneous and stable with reference to specified properties, which has been established to be fit for its intended use in measurement, or in examination of nominal properties.

6. INTERFERENCES, LIMITATIONS AND NOTES

Suspended solids are the portion of total solids in the sample retained by a filter. The chemical and physical nature of the material in suspension, the pore size of the filter, the area and thickness of the filter mat, and the amount and physical state of the materials deposited on the filter are the principle factors affecting separation of non-filterable from filterable residue.

Note: Some clays and colloids will pass through a 2-µm filter

Residues dried at 105°C may retain not only water of crystallization but also some mechanically occluded water. Loss of CO_2 will result in conversion of bicarbonate to carbonate. Loss of organic matter by volatilization usually is very slight at this temperature. Because removal of occluded water is marginal at 105°C, attainment of constant weight is very slow.

7. EQUIPMENT AND MATERIALS

7.1 Equipment

Refer to site equipment listing for equipment details

7.1.1 Analytical balance (4 decimal places)
7.1.2 Drying oven
7.1.3 Vacuum Aparatus

7.2 Materials

7.2.1 Dessicator
7.2.2 Glass fiber filter disks
7.2.3 Beakers, assorted
7.2.4 Filter funnels
7.2.5 Pipettes
7.2.6 Filtering apparatus
7.2.7 Graduated cylinder

8. REAGENTS

Reagent name	Traceability / Grade	Storage	Shelf Life
DI water	See water quality testing or certificate on label.	Ambient	Not applicable

9. SAMPLE COLLECTION, PRESERVATION AND HANDLING

Sample Size	>500 mL
Sample Container Requirements	Suitable container, leak proof
Pre-Treatment (sub sampling)	Samples should be well mixed to ensure a homogenous aliquot is taken
Sample Storage Conditions	Refrigerate at 5°C ± 3°C.
Holding Time	Max 7 days
Labeling	SLIM work order #, sample #

10. PROCEDURE

10.1 Instrument set up

Ensure that daily verification of the analytical balance and laboratory oven has been performed and duly recorded in the associated logbooks. Refer to site work instructions.

10.1.1 Turn on laboratory oven and set to 105ºC ± 5ºC at least one hour before use to allow temperature to stabilize.

10.2 Analysis

10.2.1 Rinse glass filter disk (wrinkle side up) with de-ionized water. Dry at 105ºC ± 5ºC, cool and weigh to a constant weight (B), not differing more than 0.0005g of the previous weight). Store in desiccator prior to use.

10.2.2 Assemble the filter apparatus.

10.2.3 Using forceps, place the pre-weighed filter on the filter apparatus.

10.2.4 Shake each sample vigorously, prior to pouring.

10.2.5 Use a class A graduated cylinder to measure 500mL (to maximum 1000mL) sample into the filter funnel (volume of sample may depend on sample matrix/availability; see scope)

10.2.6 Record the volume used.

10.2.7 With the vacuum on, rinse the filter funnel wall with deionized water. Allow complete drainage between each washing.

10.2.8 Remove all traces of water by continuing to apply vacuum after the water has passed through.

10.2.9 Remove the funnel then turn off the vacuum. Using forceps carefully remove the filter from the filter support.

10.2.10 Dry filter disk containing residue at 105ºC ± 5ºC for a minimum of 60 minutes, remove from the oven, and cool in the dessicator for 60 minutes.

10.2.11 Repeat the oven drying and desiccating cycle until a constant weight (weight loss < 0.0005g) is obtained. Record the constant weight (A).

10.3 Maintenance

For daily, routine, preventive maintenance and trouble-shooting of equipment used, refer to site work instruction.

11. CALCULATIONS

$$\text{TSS (mg/L)} = \frac{(A - B) \times 1000000}{\text{Sample volume (mL)}}$$

Where A = Weight of filter + dried residue (g) (10.2.11)
B = Weight of filter (g) (10.2.1)

12. REPORTING

In SLIM the data is reviewed, validated and reported according to GQP-MIN-21.

Refer to site work instructions for additional requirements for approving and reporting data.

FREQUENTLY REQUESTED EQUIVALENTS FOR REPORTING

%	mg/L	µg/L	ppm	ppb
1	10,000	10,000,000	10,000	10,000,000
0.1	1000	1,000,000	1000	1,000,000
0.01	100	100,000	100	100,000
0.001	10	10,000	10	10,000
0.0001	1	1000	1	1000

13. QUALITY CONTROL

13.1 Quality Control Specifics

Material	Source of Material	Method Protocols/Frequency
Method Blank	Reagents taken through the decomposition stages	Refer to GQP-MIN-21 for the frequency of insertion of method blanks.
Solution Replicate	Customer sample taken at the weighing/volume measurement stage	Refer to GQP-MIN-21 for the frequency of insertion of pulp replicates
Reference Materials - Suspended Solids Check Solution	Suitable certified or in-house reference material at suitable concentration range of customer samples	Refer to GQP-MIN-21 for the frequency of insertion of reference materials.

13.2 Quality Control Objectives

Material	Data Acceptance Criteria	Actions
Method Blank	The tolerance is calculated by SLIM (Refer to GQP-MIN-21)	If outside these limits then refer to GQP-MIN-21
Solution Replicate	The tolerance is calculated by SLIM (Refer to GQP-MIN-21)	If outside these limits then refer to GQP-MIN-21
Reference Materials - Suspended Solids Check Solution	The tolerance is calculated by SLIM (Refer to GQP-MIN-21)	If outside these limits then refer to GQP-MIN-21

The Supervisor or designated analyst must be informed of quality control parameter failure. Refer to GQP-MIN-21 for Laboratory QC protocols. When required, a CAR will be filed for data failure or inability to repeat the analysis and provide the customer with quality data.

13.3 Validation

The validation process tests the method performance and determines its fitness for purpose. This method is fit for purpose and the validation data and calculations are located in the validation and measurement uncertainty spreadsheet GQT-MIN-05. Refer to GQP-MIN-15 for Method Validation and Measurement Uncertainty procedure.

14. REFERENCES

14.1 Associated Documents

GQP-MIN-21: Laboratory Quality Control
GQP-MIN-15: Method validation and Measurement Uncertainty
GQT-MIN-05: Method Validation and Measurement Uncertainty Template

OI Management System Procedures:
https://sgs.sharepoint.com/intranet/functions/oi/Pages/20180214-OIMS.aspx
OIMS Training Manual(s):
https://sgs.sharepoint.com/intranet/functions/oi/Pages/20180320-TrainingMaterials.aspx
SGS Rules for Life:
https://sgs.sharepoint.com/intranet/functions/oi/Pages/20180330-RulesforLife.aspx

Refer to Addendum for site specific documents which may include quality procedures, work instructions, quality forms, logs and spreadsheets

Appendix 1: Key documents

	Document title	In text ref	Availability
1	Amendment Notice 1 – L8148/2006/4 Koolan Island Iron Ore Mine and Port, granted 17 February 2017	Amendment Notice 1	accessed at www.dwer.wa.gov.au
2	Amendment Notice 2 – L8148/2006/4 Koolan Island Iron Ore Mine and Port Facility, granted 18 October 2017	Amendment Notice 2	
3	Amendment Notice 3 – L8148/2006/4 Koolan Island Iron Ore Mine and Port Facility, granted 12 September 2018	Amendment Notice 3	
4	Gravimetric Determination of Total Suspended Solids (Document Code: G_PHY13V), Minerals Geochemistry Global, SGS Minerals, 17 May 2019	Gravimetric Determination of Total Suspended Solids	DWER records (A1803428)
5	Guidance Statement: Regulatory principles, Department of Environment Regulation, July 2015	Guidance Statement: Regulatory principles	accessed at www.dwer.wa.gov.au
6	Guidance Statement: Setting conditions, Department of Environment Regulation, October 2015	Guidance Statement: Setting conditions	
7	Guidance Statement: Risk Assessments, Department of Environment Regulation, February 2017	Guidance Statement: Risk Assessments	
8	Guideline: Decision making, Department of Water and Environmental Regulation, June 2019	Guideline: Decision making	
9	Koolan Island Iron Ore Mine and Port Facility Project Marine Management Plan (v19), Mount Gibson Iron Limited, 2015	Marine Management Plan (v19)	DWER records (A1802383)
10	Koolan Island Iron Ore Mine and Port Facility Project Statement Re-Implementation (Stage 1 and 2) Marine Management Plan (Ver 20, 6 September 2016), Mount Gibson Iron Limited	Marine Management Plan (v20)	DWER records (A1435023)

	Document title	In text ref	Availability
11	Koolan Island Iron Ore Project, Annual Environmental Report 2018 & Annual Audit Compliance Report Licence L8148/2006/4, Mount Gibson Iron Limited, 11 March 2019	2018 AER	DWER records (A1792676)
12	Licence L8148/2006/4 – Koolan Island Iron Ore Mine and Port, granted 19 May 2016	Licence L8148/2006/4	accessed at www.dwer.wa.gov.au
13	Licence Amendment Application L8148/2006/4, received from John Tomich (Mt Gibson Iron Ltd), dated 8 May 2019	Application, 2019	DWER records (A1787089)
14	Ministerial Statement 715	Ministerial Statement 715	accessed at www.epa.wa.gov.au
15	RE: Applicant Notification – L8148/2006/4 – Notice of Proposed Amendment to Licence, received from Tim Wride (Mt Gibson Iron Ltd), dated 17 July 2019	Koolan, 2019	DWER records (DWERDT179658)