

**Boliden Tara Mines Limited  
IPPCL P0516-03**

**Annual Environmental Report (AER)  
January – December 2013**





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## SECTION 1 MANAGEMENT OF THE ACTIVITY

### 1.1 REPORT PERIOD

This Annual Environmental Report (AER), a requirement of Boliden Tara Mines Limited IPPCL No P0516-03 Schedule E presents a summary of environmental information for the period from the 1st January 2013 to 31st December 2013.

### 1.2 REPORT OVERVIEW

The AER is structured into sections

**Section 1** provides a brief description of the Company and provides details on the Environmental Management System (EMS) in place including the proposed Objectives and Targets for 2014.

**Section 2** presents summary information on the environmental performance of the site and includes monitoring data, resource usage / energy efficiency, waste management, environmental incidents and complaints.

**Section 3** presents annual and licence specific reports.

Emission data and off-site transfers of waste are reported through the PRTR Emissions Reporting Workbook which is presented in Appendix 1.

AER / PRTR Reporting Workbook
Releases to Air
Releases to Water
Treatment and Transfer of waste

Some of the environmental information is presented in the new AER templates which are presented in Appendix 2.

AER Templates
Facility Summary Information
Air
Water / Waste water
ELRA
Environmental Management Programme (EMP) Report
Resource / Energy
Complaints / Incidents

### 1.3 FACILITY INFORMATION SUMMARY

<b>IPPCL Registration No.</b>	P0516-03
<b>Operator Name</b>	Boliden Tara Mines Limited
<b>Operator Address</b>	Knockumber, Navan, Co. Meath, Ireland.
<b>National Grid Reference (12 digit 6E,6N)</b>	Main Site: 284877E, 267985N Tailings Facility: 285160E, 271557N
<b>NACE Code</b>	0729
<b>Main Economic Activity</b>	Mining of non-ferrous metal ore
<b>Class of Activity</b>	Schedule 1 Class 1.3 (a) Class 1.3 (b)
<b>RBME Risk Category</b>	A3

### 1.4 DESCRIPTION OF ACTIVITIES

Boliden Tara Mine Limited (Tara Mines), the largest operating zinc and lead mine in Europe, is located at *Knockumber*, 2 km from west of Navan in County Meath and 50 km northwest of Dublin. Originally sited in a rural area, expansion of Navan has resulted in the development of residential areas nearer to the mine although much of its surroundings remain flat agricultural land drained by prolific fishing rivers. The mine is currently divided into the following 3 sub-areas for management and planning:

- The Central Area known as the 'Main Mine' (first area to be mined and reserves have largely been depleted).
- The South West Extension (SWEX) is southwest of the Main Mine.
- Nevinstown is north of the Main Mine.

The River Blackwater, which flows into the River Boyne, passes over the 'Rathaldron/ liscartan orebody' and forms a surface intersection feature between the 'Main orebody' and the 'Nevinstown orebody'.

The mine exploits the Zn-Pb deposit, which was discovered in 1970. The orebody lies between 50 and 1000 metres below the surface and extends over an area of 6.5 kilometres by 1.5 kilometers. The combination of a gently dipping orebody, together with a large geographical area, requires a mining method that utilises mobile equipment for ore haulage, rock drilling and explosives charging.

Development of the orebody commenced in 1973 and production mining and processing has been in operation since 1977. Tara currently produces between 2.4 and 2.5 million tonnes of ore per annum, resulting in 400,000 tonnes of zinc and lead concentrate.

Ore production encompasses the drilling, blasting and removal of the ore from underground deposits. Broken ore is delivered to one of five underground primary crushers and reduced in size to less than 150 millimetres before being hoisted to the surface. Ore is then fed to an Autogenous grinding mill which grinds the ore to a fine powder which is then pumped as aqueous slurry to metallurgic flotation cells.

Within the flotation cells, galena (Lead sulphide) and sphalerite (Zinc sulphide) are differentially separated, while undesirable minerals such as pyrite are depressed. Once the target minerals have been extracted the tailings stream is cycloned to separate the coarse sand fraction from the finer slimes fraction. The coarse fraction of tailings is pumped, to the underground mined out areas. In so doing, approximately 50% of the tailings are used underground to backfill mined voids. The tailings used for backfilling is stabilised, chemically and physically, by mixing with cement.

The remaining fines fraction tailings is pumped as an aqueous slime to the Tailings Storage Facility (TSF) located some 3 km north of the processing plant in the townland of Randalstown (*Grid ref: E 285,100, N 271,545 Irish National Grid*). The TSF encloses a footprint area of approximately 180 hectares. The facility serves as containment for tailings to settle and consolidate, as well as a treatment storage area for the water which is circulated back to the processing plant at Knockumber for re-use. On an annual basis approximately 1.2 million tonnes of tailings are deposited for permanent storage in the TSF.

## **1.5 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) AT TARA**

Environmental Management has always been at the core of operations at Tara since the development of the mine commenced in 1973. Today Tara's Environmental Management System (EMS) ensures the company achieves best practice in all areas of environmental management and compliance and is accredited to the internationally recognised ISO 14001:2004 EMS. All company activities and emissions are controlled, operated and maintained as set out in conditions of their IPPCL P0516-03.

Tara's Environmental, Energy, Health and Safety Policy as defined by management are the driver for implementing and improving the Company's EMS. As part of this commitment, senior management has designated specific personnel with defined responsibility and authority for implementing the EMS. Resources include human resources and specialized skills, organizational infrastructure, technology and financial resources.

Tara is always looking at new ways to improve environmental management on site and reduce its impacts on the environment. Continual improvement is managed through Environmental Management Programme's (EMP) as required by the EMS. Tara maintains an Environmental Aspects Register, which identifies and lists all aspects of its activities and details information on their associated impacts, control measures, operating conditions, significance rating, monitoring,

applicable operating procedures and applicable legal requirements. This register is updated as part of the management review process and takes account of any new developments on site.

The EMP documents the strategy for achieving the planned objectives and targets and:

- Identifies specific actions which are required to ensure that environmental objectives are achieved
- Assigns appropriate responsibilities for achieving each environmental objective
- Sets deadlines for achieving the various environmental objectives.

The most significant environmental aspects and associated impacts are considered when setting annual objectives and targets as well as identifying areas for improvement such as emissions to water, waste generation, nuisance and energy efficiency.

A review of the EMP for 2013 is presented in AER templates in Appendix 2. Proposed objectives and targets for 2014 are presented in Tables 1.1 below.

## **1.6 ENVIRONMENTAL, ENERGY, HEALTH & SAFETY POLICY STATEMENT**

Boliden Tara Mines Ltd, part of the Swedish Boliden AB group, operates Europe's largest zinc mine at Navan, County Meath, with approximately 650 employees. Tara Mines' main activities include exploration, mining, processing, shipping of concentrates and the storage of related tailings waste.

Boliden Tara Mines Ltd. aims to achieve the highest standards in environmental, energy and health and safety management (EEHS) and believes that good EEHS performance is integral to the sustainability and future success of the company. This combined policy integrates our Environmental, Energy, Health & Safety commitments and outlines our aims to maintain a safe work place and improve the competitiveness of the company by minimising the environmental impacts and improving the energy efficiency of our operations.

In order to achieve our EEHS goals we will:

Commit to prevention of injury, ill health, prevention of pollution and improved energy efficiency.

Commit to continual improvement in environmental protection, energy performance and EEHS management and performance.

Provide all necessary information and resources to achieve our EEHS objectives and targets and successfully implement and maintain the EEHS management systems.

Comply with all relevant EEHS legislation and other requirements.

Identify, assess, prioritise and actively manage significant environmental and energy aspects and health and safety risks.

Establish and continually review EEHS objectives and targets through regular EEHS team meetings and management reviews.

Prevent, minimise and control our EEHS impacts and improve performance through best practice, planning, design, investment, maintenance, operation and workplace procedures.

Support the purchase of environmentally friendly and energy-efficient products and services.

Ensure that our EEHS policy is communicated to all employees and contractors and is made available to the public and interested parties.

Communicate with employees, communities, businesses and government to achieve better understanding of environmental, energy and health & safety issues.

Promote innovation and creativity and co-operate with relevant bodies and stakeholders to improve our EEHS management and performance.

This policy will be regularly reviewed to ensure that Tara Mines remains a safe and sustainable operation that is world class in terms of environmental protection and energy efficiency and will continue to make a significant and positive contribution to the Irish economy.

***Boliden Tara Mines Limited***



Stefan Romedahl  
General Manager



**TABLE 1.1 ENVIRONMENTAL OBJECTIVES AND TARGETS PROGRAMME 2014**

PROCESS /ACTIVITY AND ASSOCIATED ASPECT	OBJECTIVE	TARGET	PROGRAMME	RESPONSIBILITY	TIMEFRAME
CRAMP	Review of CRAMP for TMF	Throughout 2014	<ol style="list-style-type: none"> <li>1. Passive Treatment System (PTS) – design and construct a bench trial wetlands treatment system to provide details for final attenuation and treatment of cap runoff prior to discharge to Blackwater and to demonstrate its efficacy.</li> <li>2. Route to Blackwater (downstream of Liscarton intake point). Survey ground elevations of two proposed routes to Blackwater (land ownership issues to be resolved).</li> <li>3. Seepages issues along sections of western and south western walls – look at ways of directing seepage from away from western sump. Install additional boreholes to monitor groundwater seepage.</li> <li>4. Capping Material – examine alternative materials to supplement topsoil as a cap including organic waste and quarry material</li> <li>5. Review financial provisions for implementation of revised CRAMP and include provision for closure period and a 30 year aftercare management period.</li> </ol>	EHS Manager / Mill Manager / Financial Controller / Environmental Engineer	<p>Throughout 2014</p> <p>1Q 2014</p> <p>Throughout 2014</p> <p>Throughout 2014</p> <p>2Q 2014</p>

PROCESS /ACTIVITY AND ASSOCIATED ASPECT	OBJECTIVE	TARGET	PROGRAMME	RESPONSIBILITY	TIMEFRAME
CRAMP	Review of Closure plan for Mine site & underground facilities	Throughout 2014	<ol style="list-style-type: none"> <li>1. Carry out contaminated land assessment of the mine site (main focus on contamination by metals and TPH's) Installation of new monitoring boreholes wells, trial pits &amp; soil sampling.</li> <li>2. Quantification of all surface and underground infrastructure to be carried out by Quantity Surveyor.</li> <li>3. Review water issues in relation to post-closure recovery predictions for groundwater levels and hydrochemistry of the flooded workings mine.</li> <li>4. Review financial provisions for implementation of revised CRAMP and include provision for the 'closure period' and a minimum '30 year aftercare management period'.</li> <li>5. Change in planning for 'Afteruse' of site (currently Agricultural).</li> </ol>	EHS Manager / Mill Manager / Mine Maintenance Manager/ Financial Controller / Environmental Engineer	Throughout 2014
Protection of Groundwater and Surface water	Test the integrity and water tightness of all banded structures and underground pipes	Throughout 2014	Integrity assessment of all banded structures and underground pipes will be carried out using hydrostatic testing (as per BS 8007:1987). Should any structure fail integrity test appropriate remedial works will be carried out. Report of testing and remedial work shall be forwarded to the EPA.	Environmental Engineer	4Q 2014

PROCESS /ACTIVITY AND ASSOCIATED ASPECT	OBJECTIVE	TARGET	PROGRAMME	RESPONSIBILITY	TIMEFRAME
Protection of Surface water	Improve quality of discharge water to River Boyne by reducing Sb concentration in process water	To comply with Surface water EQS downstream of discharge point	<p>Research options available for reducing Antimony concentration in process water (refer to Antimony Project Plan Alder Reference C1000424)</p> <p>Calculate assimilative capacity of the River Boyne and control levels of Antimony in discharge</p> <p>Daily sampling downstream of discharge</p> <p>Develop &amp; test pilot (bench / lab tests) treatment systems</p> <p>Select chemicals &amp; seek EPA approval</p> <p>Trial successful lab tests in pilot scale system</p> <p>Evaluate &amp; then perform test and trials on scalable solution</p> <p>Design &amp; install final treatment system</p>	Mill Manager / EHS Manager / Environmental Engineer	Throughout 2014 End 1Q 2015
Tailings Management	Reduce quantity of tailings deposited in TMF	50% of tailings returned to the mine as backfill	<p>Ensure backfilling operations are optimised through better communication between mine and mill management.</p> <p>Better utilisation of continuous backfill pipeline.</p>	Mine Manager Mill Manager	2014
Borrow pit Re-instatement	Reinstate 20 hectares of borrow area disturbed in Stage 5 Raise Embankment	End 3rd Q 2015	Reinstate 20 hectares of Northern borrow pit - Spread stored topsoil, level and revegetate with suitable grasses.	Environmental Engineer	End 3rd Q 2015

PROCESS /ACTIVITY AND ASSOCIATED ASPECT	OBJECTIVE	TARGET	PROGRAMME	RESPONSIBILITY	TIMEFRAME
Waste Management	Reduce quantity of silt and sludge stored on surface	Throughout 2014	Quantify amount of silt washings from Batching Plant stored onsite. Method of treatment to be decided at SEHSQ meeting. Work out a monthly schedule of quantities.	Mine Manager / Mill Manager EHS Manager	Throughout 2014

## Section 2 SUMMARY OF MONITORING INFORMATION AND WASTE TRANSFER

This section presents summary information on environmental monitoring carried out for the period 1st January 2013 to 31st December 2013. All environmental monitoring has been carried out in accordance with IPPCL conditions and interpretation of summary information as required in Schedule E is presented.

Emissions data to atmosphere and surface water is presented in the AER/PRTR Reporting Workbook in Appendix 1 and AER summary templates in Appendix 2.

### 2.1 EMISSIONS TO ATMOSPHERE

In accordance with IPPCL P0516-03 control and monitoring of emissions to atmosphere are carried out as per Schedule C.1.2.

Monitoring of emissions to atmosphere is carried out at emissions reference points listed in Table 2.1 below:

**Table 2.1 Emissions to Atmosphere**

<b>Emission Reference Point No.</b>	<b>Location</b>
<b>A2 - 4</b>	Concentrate Loadout Building
<b>A2 - 5</b>	Mine Vent Shaft Return Air Raise (RAR) 1
<b>A2 - 6</b>	Mine Vent Shaft Return Air Raise (RAR) 2
<b>A2 - 7</b>	Mine Vent Shaft Return Air Raise (RAR) 3 North
<b>A2 - 8</b>	Mine Vent Shaft Return Air Raise (RAR) 3 South
<b>A2 - 9</b>	Mine Vent Shaft Return Air Raise (RAR) 4
<b>A2 - 10</b>	Mine Vent Shaft Return Air Raise (RAR) 5

Emissions from the processing plant are from a single remaining point source ventilation stack on the concentrate storage building (**A2-4**). The remaining air emission sources are from mine return air shafts which serve to ventilate the underground workings in the mine.

Mass emissions to atmosphere for 2013 are presented in the AER/PRTR Reporting Workbook in Appendix 1 and AER summary templates in Appendix 2.

All emissions to atmosphere during 2013 are in full compliance with emission limit values set out in IPPCL Schedule B.1.1.

## **2.2 EMISSIONS TO WATER**

Tara has only one 'point source emission' to surface water, Emission Point Reference **SW1** of process effluent to the River Boyne. This discharge includes treated process water, excess mine water and surface drainage water captured in the site water management system. This excess, treated water is discharged at a flow dilution ratio of >100:1. Discharge is recorded and controlled from the processing departments Central Control Room.

In accordance with IPPCL Reg. P0516-03 control and monitoring of process effluent emissions to water is carried as per Schedule C.2.2.

Process effluent emission data for 2013 is presented in the AER/PRTR Reporting Workbook in Appendix 1 and AER summary templates in Appendix 2.

During 2013 all licensed parameters were in full compliance with Emission Limit Values set out in IPPCL Schedule B.2.

## **2.3 RESOURCE USAGE / ENERGY EFFICIENCY**

Tara became a member of the Sustainable Energy Authority of Ireland's LIEN network in 1995 and joined SEAls' Energy Agreements Programme in 2007. Tara became certified to the international energy management standard ISO 50001 in October 2012 putting Tara at the forefront of Energy Management Systems (EnMS) in the mining sector.

Tara Mines is also currently developing a series of energy efficiency projects as part of SEAls' Exemplar Programme under the National Energy Services framework which is aimed at establishing an ESCO or energy performance contracting (EPC) model for energy efficiency projects in Ireland.

Energy spend at Tara Mines is forecast to be in the region of €20 million for 2014. Energy efficiency and CO<sub>2</sub> reductions are an essential part of the Company's campaign towards sustainable development.

As part of ISO 15001, Tara has established a comprehensive register of energy aspects and energy factors to identify significant energy users and energy drivers. This is updated in response to significant changes in our process as required by the energy standard and is used to help set energy objectives and targets and implement energy reduction programmes across the site. Copies of our EnMS, energy aspects register and energy audits are all available for inspection.

Energy and water consumption for 2013 is presented in AER templates in Appendix 2.

## **2.4 ENVIRONMENTAL COMPLAINTS / INCIDENTS**

There were a total of 28 complaints received during 2013. All complaints received are responded to in an appropriate manner. Of complaints received, 25 were in relation to ground vibration resulting from underground blasting. For many complaints relating to blast vibration a temporary monitoring station is set up at complainant's residence. Also if necessary an independent structural assessment of the property is carried out. Details of complaints received during 2013 are presented in AER summary templates in Appendix 2.

All environmental incidents are reported to the Environmental Department who in turn deals with the notification to the necessary regulatory bodies. All incidents are investigated and appropriate response carried out. Details on incidents with potential for environmental impact during 2013 are presented in AER summary templates in Appendix 2.

## **2.5 WASTE MANAGEMENT**

### **2.5.1 Disposal/Recovery of Waste on-site**

Disposal and recovery of waste on-site takes place in accordance with conditions of IPPCL and in accordance with National and European legislation and protocols.

Subject to condition 8.2.1 a Waste Management Plan (known as an Extractive Waste Management Plan) for the minimisation, treatment, recovery and disposal of extractive waste was drawn up and submitted to the Agency for agreement (Alder Submission reference LR005650).

### **2.5.2 Waste Disposal in the Tailings Management Facility (TMF)**

The TSF has been constructed and operated in five stages, Stages 1, 2, 3 and the upstream Stage 4A and 4B raises. Stage 5A, the current active dam was completed in 2013 (initial sliming commenced in July).

Tailings is pumped as an aqueous slime from the processing plant through a 630mm diameter high-density polyethylene delivery pipeline and deposited in the Tailings Storage Facility (TSF). All waste deposited in the TSF is monitored as in accordance with Schedule C.4.

The volume of tailings pumped is measured continuously by flow meters. The tailings slurry is discharged in turn from a series of spigots located at 80m intervals around the periphery of the dam. The tailings solids settle and consolidate and a pond of supernatant water remains over the tailings surface. Tailings discharge is controlled manually based on daily visual inspection of the dam surface to achieve even distribution. The quantity, tonnage and volume, of tailings distributed during 2013 is presented in Table 2.2.

The remaining storage capacity in Stage 5B on 31/12/2013 was 3.24 million tonnes 2.28 million cubic meters.

**Table 2.2 Tailings Tonnage and Volume Distribution 2013**

<b>Month</b>	<b>Tailings Deposited (t) Stage 4B</b>	<b>Volume of Tailings (m<sup>3</sup>) Stage 4B</b>	<b>Tailings Deposited (t) Stage 5A</b>	<b>Volume of Tailings (m<sup>3</sup>) Stage 5A</b>
January	110,524	77,834		
February	96,529	67,978		
March	95,991	67,599		
April	131,140	92,352		
May	112,971	79,557		
June	109,223	76,918		
July	56,499	39,788	13,580	9,563
August	88,933	62,629	48,337	34,040
September	67,926	47,835	52,836	37,208
October	46,567	32,794	83,026	58,469
November	24,920	17,549	96,687	68,089
December	14,625	10,299	102,375	72,095
<b>Total 2013</b>	<b>955,849</b>	<b>673,133</b>	<b>396,842</b>	<b>279,466</b>

### 2.5.3 Disposal / Recovery of Hazardous and Other Wastes off-site

Tara is committed to environmental protection and the minimisation and prevention of pollution that may arise as a result of on-site operations. Where practicable, waste is managed according to the Waste Management Hierarchy where prevention is the most favoured option and disposal a last resort when recycling and reuse is not possible.

Procedures and facilities are in place to enable the proper segregation and safe storage of waste materials on site. Waste sent off-site for the recovery or disposal are transported by authorized waste contractor. Prior to transfer off-site, all waste is classified, packaged and labeled in accordance with National and European standards.

Details of all waste materials generated on site and sent off-site for recovery or disposal during 2013 have been reported in the AER/PRTR Reporting Workbook and are presented in Appendix 1.



## **2.5.4 Waste Disposal in the Landfill Area**

The onsite landfill (approximately 8 ha) is inactive and has not been used for the disposal of waste, since 2001.

In the intervening period selected sections have been used for the segregation and temporary storage, prior to removal off-site, of non-hazardous waste materials including waste steel, timber, rubber conveyor belt and waste tyres. This practice has also ceased and a dedicated waste segregation compound now provides for the safe segregation and temporary storage of all non-hazardous waste streams.

This 'landfill' area is currently being used for the temporary storage of surplus mine rock which is reused in the mine for construction and road building.

In December 2013, in accordance with IPPCL Condition 8.13.1 and as part of a phased site remediation and closure plan for this landfill area and other areas on the site, a series of monitoring boreholes were installed in the landfill area and down gradient of the landfill across the site. Monthly monitoring of these boreholes is planned for 2014 to get a better understanding of groundwater quality and help identify potential pollution issues.

## **2.6 SUMMARY OF MONITORING INFORMATION**

### **2.6.1 Surface Water Monitoring**

Surface water monitoring is carried out in accordance with Schedule C.8 of Tara's IPPCL. A summary of 2013 surface water monitoring data is presented in Table 2.3 (values are based on annual average (AA) concentrations).

River and stream samples are taken monthly from 13 locations on the River Boyne, River Blackwater and its tributaries representing locations both upstream and downstream of the TSF, the mine site and the discharge point (SW1) to the River Boyne.

The EC Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 Environmental Quality Standards (EQS) values are used as a guide for comparison with measured concentrations in surface waters. Refer to URS's report *Review of 2013 Hydro-Environmental Monitoring Data* (Alder Submission Reference LR008874).

## 2.6.2 Groundwater Monitoring

Groundwater monitoring is carried out in accordance with Schedule C.7 of Tara's IPPCL. A summary of 2013 groundwater monitoring data is presented in Tables 2.4 to 2.6 (values are based on annual average (AA) concentrations).

The existing groundwater monitoring network in the vicinity of the Randalstown TSF involves monthly sampling at 26 locations in superficial deposits/overburden (OB) and bedrock (BR) boreholes and quarterly sampling from 10 domestic wells. All groundwater quality data is reviewed in line with relevant water quality standards. The EC Environmental Objectives (Groundwater) Regulations S.I. No 9 of 2010 Threshold values are used as a guide for comparison with measured concentrations in groundwater.

A review of hydrogeological, hydrological and water quality monitoring data collected during 2013 is presented in URS's report *Review of 2013 Hydro-Environmental Monitoring Data* (Alder Submission Reference LR008874). The report reviews 2013 data and compares with historic monitoring data between 1996 - 2010 to identify changes and trends in hydrogeological and water quality conditions.

The original groundwater monitoring network has evolved and expanded over the years as development has taken place. In response to recommendations for additional monitoring boreholes in URS's report *Review of 2012 Hydro-Environmental Monitoring Data* six new bedrock boreholes and nine superficial deposit boreholes were installed in December 2013. These additional boreholes will be included in the 2014 monitoring network.

## 2.6.3 Ambient Air Monitoring

Continuous ambient air monitoring is carried out at 6 sampling locations around the mine site and TSF in accordance with IPPCL Schedule C.1.3 using Low Volume Sampling devices for suspended particulates and metals. The sampling method is a modification of European Standard EN 12341:1999.

There were no exceedances of Emission Limit Values (ELV) during 2013 and levels are in compliance with Air Quality Standards Regulations SI 244 of 1987. A summary of 2013 monitoring data is presented in Table 2.7.

Dust deposition monitoring is carried out at 12 sampling locations around the mine site and TSF. Samples are collected on a monthly basis and analysed in accordance with IPPCL Schedule C.1.3. Monitoring is performed using Bergerhoff gauges specified in the German Engineering Institute VDI 2119 entitled "Measurement of Dustfall Using the Bergerhoff Instrument (Standard Method)" in accordance with TA Luft Standard.

There was no exceedance of Emission Limit Values (ELV) during 2013. A summary of 2013 monitoring data is presented in Table 2.8.

## 2.6.4 Noise Summary Report 2013

Continuous noise monitoring is carried out at four fixed stations around the mine site and at one fixed station as a control measure during construction works at the TMF. Monitoring is carried out as per ISO 1996 Part 1.

Noise emissions from the mine site plant are continuous and are the same for daytime and night time due to the 24 hr/ 7 day operation. Many individual noise sources are 'tonal' in character, however when these sources operate together reverberating inside a building the resultant emission outside the building can be described as 'broadband'. Where significant single noise sources are tonal, abatement measures are immediately taken.

The tailings storage facility (TSF) lies in a rural setting and existing noise levels are typical of such an environment. Normal operation of the facility does not generate any discernible noise. The main noise sources have been associated with construction activity and temporary noise monitoring is carried out as required during the construction phase of the tailings facility extensions.

All site operations are at a level significantly below noise level limits set out in Condition 5.5;

Daytime	55dB (A) expressed as Leq, 15 min
Night-time	45dB (A) expressed as Leq, 15 min

One complaint was received relative to noise from Tara activities during 2013 (details are presented in AER summary template in Appendix 2).

In accordance with IPPCL Condition 6.18.2 an annual noise survey of the installation operations was carried out in December 2013. A summary report of this record is presented in the AER summary templates in Appendix 2.

## 2.6.5 Vibration Summary Report

Continuous blast vibration (and air overpressure) monitoring is being carried out at 5 fixed location stations and at a minimum of 3 temporary locations around the mine site and SWEX area (the number of temporary locations depending on requests from residents). Monitoring is carried out as per ISEE Field Practice Guidelines for Blasting Seismographs.

All blasts are designed to generate low levels of ground vibration. The development blasting periods are daily from 06:00 – 07:00 hrs and 18:00 – 19:00 hrs while the production blasting period is from 18:00 – 19:00 hrs.

25 complaints were received during 2013 relative to blast vibration. Limits specified in IPPCL Condition 5.8 were not exceeded at any monitoring location during 2013;

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Daytime	8mm/sec
Night-time	4mm/sec

For many of the complaints relating to blast vibration a temporary monitoring station is set up at complainant's residence. Also if necessary an independent structural assessment is carried out.

### **2.6.6 Monitoring at Tailings Management Facility (TMF)**

Monitoring of the Tailings Management Facility is carried out in accordance with IPPCL Schedule C.5.

Embankment settlement / movement of the TMF retaining wall are observed by a series of movement monitoring instruments. Horizontal movements are monitored by inclinometers and monitoring pegs while vertical movements are monitored by extensometers, settlement plates and monitoring pegs.

- Topographic survey of tailings settlement during 2013 was undertaken on 12<sup>th</sup> March, 3<sup>rd</sup> July and 2<sup>nd</sup> September on Stage 4B and on 11<sup>th</sup> December on Stage 5A.
- Embankment settlement / movement is surveyed at quarterly intervals at fixed settlement monitoring pegs on  
Stage 4A: 18<sup>th</sup> February, 28<sup>th</sup> September, 6<sup>th</sup> November & 5<sup>th</sup> December  
Stage 4B: 19<sup>th</sup> February, 20<sup>th</sup> September, 6<sup>th</sup> November & 5<sup>th</sup> December  
Stage 5A: 14<sup>th</sup> October, 6<sup>th</sup> November & 26<sup>th</sup> November

A review of all monitoring carried out at the TMF during 2013 was undertaken by Golder Associates and is presented in *Annual Safety Inspection and Monitoring of Tailings Dam* (Alder Submission Reference LR008680).

**Table 2.3 Surface Water Monitoring Summary 2013**

Parameter	EQS	Unit	TOA	TOB	T4	T5	T6	T7	T8	T10	T11	T12	T13	T14	T15
<b>pH</b>	<b>6-9</b>		8.1	8.2	7.7	8.2	8.2	7.9	8.1	7.8	7.9	8.2	8.0	8.1	8.0
<b>Temperature</b>		°C	10.7	10.7	10.0	10.2	10.3	10.5	11.1	10.7	10.6	10.6	10.7	10.8	10.75
<b>Sp E Cond.</b>		uS/cm	642	654	419	589	670	350	686	778	372	621	558	644	573
<b>Dissolved Oxygen</b>		mg/l	9.7	9.3	9.7	9.6	10.0	9.4	9.5	9.1	10.0	9.5	10.0	9.4	9.9
<b>Suspended Solids</b>		mg/l	4	5	6	6	4	6	16	27	27	5	13	5	9
<b>Nitrate as NO<sub>3</sub></b>		mg/l	2.4	3.0	3.1	3.1	3.0	3.3	5.7	2.8	2.4	6.8	6.3	10.3	3.6
<b>Sulphate</b>		mg/l	40	44	23	36	38	18	55	55	22	27	37	28	86
<b>Ammonia as NH<sub>4</sub></b>	<b>0.140</b>	mg/l	<0.15	<0.14	<0.16	<0.09	<0.09	<0.09	<0.10	<0.20	<0.08	<0.05	<0.15	<0.06	<0.15
<b>Hardness as CaCO<sub>3</sub></b>		mg/l	337	366	215	260	325	206	366	359	146	308	371	313	329
<b>Zinc</b>	<b>0.050</b>	mg/l	<0.007	<0.005	<0.008	<0.007	<0.012	<0.004	<0.003	<0.004	<0.004	<0.006	<0.003	<0.006	<0.007
<b>Lead</b>	<b>0.0072</b>	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
<b>Iron</b>		mg/l	0.015	0.016	0.043	0.024	0.028	0.061	0.012	0.005	0.038	0.007	0.012	0.006	0.003
<b>Cadmium</b>	<b>0.0015</b>	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
<b>Arsenic</b>	<b>0.025</b>	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
<b>Chloride</b>		mg/l	18	23	18	19	19	16	17	26	16	18	17	18	15

Parameter	EQS	Unit	TOA	TOB	T4	T5	T6	T7	T8	T10	T11	T12	T13	T14	T15
<b>Cyanide</b>	<b>0.010</b>	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
<b>Copper</b>	<b>0.030</b>	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
<b>Chromium</b>	<b>0.0047</b>	mg/l	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
<b>Cobalt</b>		mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
<b>Magnesium</b>		mg/l	8	8	8	8	8	8	11	12	8	9	11	9	10
<b>Manganese</b>		mg/l	0.030	0.035	0.035	0.036	0.065	0.028	0.054	0.046	0.029	0.026	0.079	0.026	0.032
<b>Nickel</b>	<b>0.020</b>	mg/l	<0.005	<0.006	<0.003	<0.006	<0.005	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
<b>Mercury</b>	<b>0.00005</b>	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
<b>Sodium</b>		mg/l	12	11	9	8	8	8	8	14	8	8	7	9	7
<b>Aluminium</b>		mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
<b>Antimony</b>		mg/l	<0.004	<0.007	<0.004	<0.005	<0.005	<0.004	<0.004	<0.005	<0.004	<0.004	<0.004	<0.004	<0.004

**Table 2.4 Bedrock Groundwater Monitoring Summary 2013**

Parameter	EQS	Unit	OB1 (P1)	OB4 (P1)	BR1	BR2	BR3	BR4	BR5	BR6	BR7	BR8	BR9	BR10	GR1
Water Level		(mbgl)	6.58	3.42	13.87	8.55	6.08	6.76	2.71	5.20	5.20	2.83	6.34	4.76	2.84
pH			6.9	7.4	8.3	7.1	7.7	7.4	7.4	7.8	7.6	7.9	7.7	8.1	7.3
Temp (°C)		°C	12.4	12.9	12.6	13.5	12.8	12.4	13.2	12.1	12.6	12.6	13.0	13.0	12.5
Sp E Cond.	1875	uS/cm	1015	922	703	796	472	643	624	420	587	486	439	488	697
Dissolved Oxygen		mg/l	6.1	6.4	8.3	7.6	5.7	6.2	7.2	7.5	7.4	7.9	6.8	8.1	6.6
Sulphate	187.5	mg/l	416	280	121	112	14	69	12	25	36	18	32	16	32
Manganese		mg/l	0.427	1.016	0.167	0.925	0.103	0.305	0.073	0.316	0.116	0.082	0.154	0.037	0.484
Zinc		mg/l	<0.031	<0.053	<0.007	<0.759	<0.008	<0.011	<0.006	<0.032	<0.008	<0.005	<0.008	<0.006	<0.008
Lead	0.01875	mg/l	<0.005	<0.003	<0.002	<0.003	<0.002	<0.002	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Iron		mg/l	<0.002	<0.002	<0.028	<0.102	<0.021	<0.027	<0.047	<0.043	<0.021	<0.021	<0.002	<0.025	<0.030
Arsenic	0.0075	mg/l	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Nitrite as N	0.375	mg/l	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.051
Nitrate as N		mg/l	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chloride	187.5	mg/l	22	44	19	13	19	19	13	20	29	12	16	25	12
Phosphorous		mg/l	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Magnesium		mg/l	52	33	15	21	19	16	34	15	30	29	145	15	22

Parameter	EQS	Unit	OB1 (P1)	OB4 (P1)	BR1	BR2	BR3	BR4	BR5	BR6	BR7	BR8	BR9	BR10	GR1
<b>Mercury</b>	<b>0.00075</b>	mg/l	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007
<b>Nickel</b>	<b>0.015</b>	mg/l	<0.003	<0.008	<0.003	<0.011	<0.003	<0.002	<0.003	<0.003	<0.003	<0.006	<0.005	<0.004	<0.004
<b>Potassium</b>		mg/l	2.9	2.5	1.8	1.5	4.1	1.3	2.7	1.2	1.7	2.3	1.0	3.1	1.3
<b>Sodium</b>		mg/l	31	20	15	11	18	8	11	7	13	14	11	17	12
<b>Aluminium</b>	<b>0.150</b>	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
<b>Ammonia as NH<sub>4</sub></b>	<b>0.175</b>	mg/l	<0.43	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27



**Table 2.5 Overburden Groundwater Monitoring Summary 2013**

Parameter	EQS	Unit	OB1 (P2)	OB2	OB3	OB4 (P2)	OB5	OB6	OB7	OB8	OB9	OB11	OB12	OB13
Water Level		(mbgl)	5.75	7.33	4.28	3.31	7.17	5.59	3.26	4.51	2.48	7.32	3.95	4.71
pH			7.1	7.1	7.1	7.2	7.2	6.9	7.7	7.1	7.2	7.2	7.1	7.2
Temp (°C)		°C	11.4	13.0	12.2	13.6	12.9	12.5	12.9	13.2	12.6	13.6	13.3	11.9
Sp E Cond.	1875	mg/l	1127	2126	1493	1096	857	1019	576	993	701	718	935	584
Dissolved Oxygen		mg/l	7.0	7.3	9.0	6.8	8.7	7.2	7.9	7.9	8.3	7.8	8.7	8.5
Sulphate	187.5	mg/l	278	1247	714	695	129	170	13	284	51	94	118	30
Manganese		mg/l	0.853	0.130	0.027	1.741	0.280	1.633	0.033	0.725	0.039	0.200	0.301	0.017
Zinc		mg/l	<0.021	<0.272	<0.007	<0.014	<0.008	<0.007	<0.009	<0.007	<0.002	<0.007	<0.016	<0.007
Lead	0.01875	mg/l	<0.002	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.006	<0.002
Iron		mg/l	<0.002	<0.038	<0.031	<0.094	<0.031	<0.210	<0.034	<0.034	<0.034	<0.047	<0.040	<0.034
Arsenic	0.0075	mg/l	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Nitrite as N	0.375	mg/l	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Nitrate as N		mg/l	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chloride	187.5	mg/l	17	49	29	34	11	18	24	31	10	19	40	16
Phosphorous		mg/l	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Magnesium		mg/l	40	98	45	72	21	26	3	35	11	14	23	10

Parameter	EQS	Unit	OB1 (P2)	OB2	OB3	OB4 (P2)	OB5	OB6	OB7	OB8	OB9	OB11	OB12	OB13
Mercury	0.00075	mg/l	<0.007	<0.007	<0.007	<0.007	<0.007	<0.008	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Nickel	0.015	mg/l	<0.005	<0.003	<0.003	<0.003	<0.003	<0.005	<0.004	<0.003	<0.003	<0.003	<0.005	<0.003
Potassium		mg/l	3.3	9.6	1.2	6.6	3.9	1.4	0.3	1.72	7.9	1.4	1.4	0.46
Sodium		mg/l	18	50	28	38	6	17	10	14	9	8	30	6
Aluminium	0.150	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ammonia as NH <sub>4</sub>	0.175	mg/l	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27

**Table 2.6 Domestic Well Monitoring Summary 2013**

Parameter	EQS	Unit	12R	17R	18R	22R	23R	28R	29R	30R	32R	35R
Water Level		(mbgl)	3.12	2.49	1.96	5.06	5.40	2.85	2.51	1.19	2.51	3.34
pH			7.6	7.9	7.8	7.5	7.8	7.5	7.5	7.3	7.8	7.5
Temp (°C)		°C	9.6	10.2	9.9	10.3	11.0	10.6	11.2	9.5	10.9	10.4
Sp E Cond.	1875	mg/l	755	619	623	761	587	658	704	586	586	647
Dissolved Oxygen		mg/l	6.8	5.4	8.4	4.6	8.7	4.6	8.9	4.7	4.2	7.9
Sulphate	187.5	mg/l	85	24	19	20	53	24	47	27	47	19
Manganese		mg/l	0.032	0.024	0.025	0.031	0.012	0.036	0.115	0.628	0.051	0.094
Zinc		mg/l	<0.018	<0.016	<0.011	<0.012	<0.046	<0.009	<0.015	<0.011	<0.010	<0.008
Lead	0.01875	mg/l	<0.002	<0.002	<0.003	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002	<0.003
Iron		mg/l	<0.230	<0.003	<0.078	<0.002	<0.078	<0.002	<0.078	<0.020	<0.002	<0.078
Arsenic	0.0075	mg/l	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007
Nitrite as N	0.375	mg/l	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.044	<0.025	<0.025
Nitrate as N		mg/l	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.8
Chloride	187.5	mg/l	20	16	16	19	19	12	29	36	4	10
Phosphorous		mg/l	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Magnesium		mg/l	13	9	11	9	8	8	18	9	6	10

Parameter	EQS	Unit	12R	17R	18R	22R	23R	28R	29R	30R	32R	35R
<b>Mercury</b>	<b>0.00075</b>	mg/l	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007
<b>Nickel</b>	<b>0.015</b>	mg/l	<0.003	<0.003	<0.007	<0.003	<0.003	<0.004	<0.003	<0.004	<0.004	<0.003
<b>Potassium</b>		mg/l	1.8	4.7	4.7	9.70	5.2	27.2	3.1	29.4	28.5	1.0
<b>Sodium</b>		mg/l	24	8	7	7	9	10	13	11	10	7
<b>Aluminium</b>	<b>0.150</b>	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
<b>Ammonia as NH<sub>4</sub></b>	<b>0.175</b>	mg/l	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27

**Table 2.7 Ambient Air Monitoring Summary 2013**

<b>Location</b>	<b>Units</b>	<b>Total Solids</b>	<b>Zinc</b>	<b>Lead</b>	<b>Cadmium</b>	<b>Arsenic</b>	<b>Nickel</b>
<b>DA 5</b>	ug/m <sup>3</sup>	11	<0.10	<0.01	<0.01	<0.01	<0.01
<b>DA 4</b>	ug/m <sup>3</sup>	8	<0.10	<0.01	<0.01	<0.01	<0.01
<b>DA 3</b>	ug/m <sup>3</sup>	5	<0.10	<0.01	<0.01	<0.01	<0.01
<b>DA 1</b>	ug/m <sup>3</sup>	11	<0.10	<0.01	<0.01	<0.01	<0.01
<b>DA 2</b>	ug/m <sup>3</sup>	9	<0.10	<0.01	<0.01	<0.01	<0.01
<b>DA 7</b>	ug/m <sup>3</sup>	8	<0.10	<0.01	<0.01	<0.01	<0.01
<b>Ambient Air Limits</b>		<b>250</b>	<b>2</b>	<b>0.5</b>	<b>0.04</b>	<b>0.04</b>	-

**Table 2.8 Dust Deposition Monitoring Summary 2013**

Monitoring Station	Units	Total Solids	Zinc	Lead	Cadmium	Arsenic	Nickel
<b>DB 2</b>	ug/m <sup>2</sup> /d	65	64	13	<0.8	<2.7	<3.5
<b>DB 4</b>	ug/m <sup>2</sup> /d	93	47	8	<0.5	<2.6	<2.7
<b>DB 5</b>	ug/m <sup>2</sup> /d	27	38	5	<0.5	<2.6	<2.7
<b>DB 7</b>	ug/m <sup>2</sup> /d	44	51	6	<0.6	<2.6	<2.7
<b>DB 7</b>	ug/m <sup>2</sup> /d	55	53	7	<0.5	<2.7	<2.9
<b>DB 24</b>	ug/m <sup>2</sup> /d	36	107	15	<0.5	<2.8	<2.7
<b>DB 28</b>	ug/m <sup>2</sup> /d	55	85	11	<0.5	<2.6	<2.7
<b>DB 30</b>	ug/m <sup>2</sup> /d	38	83	10	<0.5	<2.6	<2.9
<b>DB 37</b>	ug/m <sup>2</sup> /d	57	74	12	<0.5	<2.9	<2.7
<b>DB 42</b>	ug/m <sup>2</sup> /d	67	86	15	<0.6	<3.1	<3.0
<b>DB 50</b>	ug/m <sup>2</sup> /d	69	36	5	<0.5	<2.6	<2.8
<b>DB 51</b>	ug/m <sup>2</sup> /d	36	47	5	<0.5	<2.6	<2.7
<b>ELV</b>		<b>350</b>	<b>500</b>	<b>250</b>	<b>5.0</b>	<b>5.0</b>	

### Section 3 ANNUAL AND LICENCE SPECIFIC REPORTS

This section of the AER presents both annual and license specific reports. During 2013 many reports / studies were carried out in accordance with licence requirements, many of which have been submitted via Alder (refer to Table 3.1)

Table 3.1 License specific Reports submitted via ALDER

Condition No	Detail	Alder Submission Reference
8.2	Extractive Waste Management Plan	LR005650
8.12.1	Review of Classification of TMF	LR005652
8.2.19	Scope for Biennial Independent Audit	LR008990
3.9	Fire-water Retention study	LR006098
12.2.2	Environmental Liabilities Risk Assessment	A separate ELRA was conducted for the mine site & underground facilities (LR005946) and the Tailings Management Facility (LR006025)
6.13.5	Sediment Sampling Programme Proposal	A sediment sampling programme proposal (LR004719) was submitted and a range of heavy metals approved. Sampling of accumulated river sediments and freshwater shrimp tissue at selected sites on the Rivers Boyne and Blackwater was carried out in September 2013

Other license specific requirements / reviews are listed below:

#### **TMF Annual Safety Audit Inspection Report (Alder Submission Reference LR008680)**

Golder Associates (UK) Limited was commissioned by Boliden Tara Mines Limited to undertake an annual safety audit of all monitoring data for the TMF for 2013 and presents a discussion of results of monitoring data obtained between January and December 2013 and observations made during a site inspection visit on the 16 and 17 January 2014.

#### **Hydro- environmental Review of the TMF (Alder Submission Reference LR008874)**

Although not a Licence requirement an annual review of hydrogeological, hydrological and water quality monitoring data collected at the Tailings

Management Facility is undertaken by URS. The 2013 hydro-environmental data is reviewed and compared with the historic monitoring data between 1996 – 2012.

### **Review of Pollution Reduction Plan for ERBD**

Part V of the European Communities Environmental Objectives (Surface Waters) Regulations S.I. No. 272 of 2009 requires each river basin district to establish a Pollution Reduction Plan for the reduction of pollution from priority substances or the ceasing or phasing out of emissions, discharges and losses of priority hazardous substances.

A Pollution Reduction Plan has yet to be prepared for the ERBD (as of March 2014); therefore a review of the plan, as required under IPPCL Condition 6.14 is not possible at this time. It is understood that the inventory of emissions, discharges and losses has been prepared and is currently under consultation

### **Emergency Planning Consultation**

Boliden Tara Mines limited have held meetings with Garda representatives responsible for emergency planning coordination within the Meath district. The Garda representatives have made two site visits and a review of Tara's emergency procedures is planned for 2Q 2014.

### **Annual Acid-Base Counting**

In accordance with IPPCL Schedule C.4 Annual Acid / Base Counting of tailings are required. This provides a means of monitoring the performance and behaviour of tailings by forecasting its acid generating potential or neutralising potential.

#### *Principal of Acid-Base Accounting*

Acid-base accounting (ABA), also called static testing, aims to predict the drainage chemistry of mine waste rock and tailings.

Sulfide minerals such as pyrite, pyrrhotite, and chalcopyrite in mine waste material react with water and oxygen to produce sulphuric acid, which may in turn leach metals from the same material and introduce them into the environment.

Samples with abundant neutralizing minerals such as calcite and dolomite may act to increase natural pH in waters and prevent or mitigate acid drainage and metal run-off.

ABA testing of tailings material was carried out on a monthly representative sample throughout 2013. This test (which meets the requirements of European Standard EN 15875) ultimately calculates a net neutralization potential (NNP) representing the ability of the tailings to produce acidic drainage or to consume free acid and neutralize it. Parameters determined in testing are prescribed in table below.



It can be concluded from results that acid-generating potential (AP) of tailings is extremely low and thus does not present an environmental issue or risk.

<b>Parameter</b>	<b>Units</b>	<b>Lower Limit</b>	<b>Upper Limit</b>	<b>Average Results</b>
<b>Neutralising Potential (NP)</b>	kgCaCO <sub>3</sub> /t	1	1000	605.5
<b>Acid Potential (AP)</b>	kgCaCO <sub>3</sub> /t	0.3	2000	74.8
<b>Net Neutralising Potential (NNP)</b>	kgCaCO <sub>3</sub> /t	1	1000	530.7
<b>Neutralising Potential Ratio (NPR)</b>	Unity	0.01	1000	8.27
<b>Total Sulfur</b>	%	0.01	50	3.27
<b>Total Sulfate (Carbognate Leach)</b>	%	0.01	50	0.87
<b>Sulfide Sulfur (Calculated</b>	%	0.01	50	2.39
<b>Total Carbon</b>	%	0.01	50	7.87
<b>Total Organic Carbon</b>	%	0.01	50	0.19
<b>Inorganic Carbon</b>	%	0.01	50	7.96

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# **Appendix 1**

## **AER / PRTR Reporting Workbook**

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[Guidance to completing the PRTR workbook](#)

# AER Returns Workbook

Version 1.1.17

<b>REFERENCE YEAR</b>	2013
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## 1. FACILITY IDENTIFICATION

Parent Company Name	Boliden Tara Mines Limited
Facility Name	Boliden Tara Mines Limited
PRTR Identification Number	P0516
Licence Number	P0516-03

Waste or IPPC Classes of Activity

No.	class_name
1.3	#####

Address 1	Knockumber
Address 2	Navan
Address 3	Co. Meath
Address 4	
	Meath
Country	Ireland
Coordinates of Location	-6.71611 53.6557
River Basin District	IEEA
NACE Code	0729
Main Economic Activity	Mining of other non-ferrous metal ores
<b>AER Returns Contact Name</b>	Ailish Mc Cabe
<b>AER Returns Contact Email Address</b>	ailish.mccabe@boliden.com
<b>AER Returns Contact Position</b>	Environmental Engineer
<b>AER Returns Contact Telephone Number</b>	0469082563
<b>AER Returns Contact Mobile Phone Number</b>	0872909220
<b>AER Returns Contact Fax Number</b>	0469071269
<b>Production Volume</b>	0.0
<b>Production Volume Units</b>	
<b>Number of Installations</b>	0
<b>Number of Operating Hours in Year</b>	8760
<b>Number of Employees</b>	650
<b>User Feedback/Comments</b>	
<b>Web Address</b>	

## 2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
3(a)	Underground mining and related operations

## 3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

## 4. WASTE IMPORTED/ACCEPTED ONTO SITE

[Guidance on waste imported/accepted onto site](#)

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	No
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This question is only applicable if you are an IPPC or Quarry site

**SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS**

RELEASES TO AIR					Please enter all quantities in this section in KGs									
POLLUTANT		METHOD			QUANTITY						QUANTITY			
No. Annex II	Name	M/C/E	Method Used		A2-4	A2-6	A2-7	A2-8	A2-9	A2-10	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
			Method Code	Designation or	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6				
17	Arsenic and compounds (as As)	M	EN 14385:2004		0.006	0.0	0.0	0.0	0.0	0.0	0.006	0.0	0.0	
18	Cadmium and compounds (as Cd)	M	EN 14385:2004		0.006	0.0	0.0	0.0	0.0	0.0	0.006	0.0	0.0	
23	Lead and compounds (as Pb)	M	EN 14385:2004		0.012	0.0	0.0	0.0	0.0	0.0	0.012	0.0	0.0	
24	Zinc and compounds (as Zn)	M	EN 14385:2004		0.198	0.0	0.0	0.0	0.0	0.0	0.198	0.0	0.0	
08	Nitrogen oxides (NOx/NO2)	M	EN 14792:2005		0.0	674.7	1015.0	885.7	1575.8	985.8	5137.0	0.0	0.0	

\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

**SECTION B : REMAINING PRTR POLLUTANTS**

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
No. Annex II	Name	M/C/E	Method Used		Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Code	Designation or				
					0.0	0.0	0.0	0.0

\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

**SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)**

RELEASES TO AIR					Please enter all quantities in this section in KGs									
POLLUTANT		METHOD			QUANTITY						QUANTITY			
Pollutant No.	Name	M/C/E	Method Used		A2-4	A2-6	A2-7	A2-8	A2-9	A2-10	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year	
			Method Code	Designation or	Emission Point 1	Emission Point 2	Emission Point 3	Emission Point 4	Emission Point 5	Emission Point 6				
244	Total Particulates	M	ALT	ISO13284-1:2002	4.112	827.745	2731.72	1493.945	3921.636	3741.076	12720.234	0.0	0.0	
215	Hydrogen sulphide	M	ALT	EN 13469:2001	0.0	28.3	23.4	21.3	29.7	31.6	134.3	0.0	0.0	

\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

**SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS** Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Rep

RELEASES TO WATERS								
POLLUTANT					Please enter all quantities in this section in KGs			
No. Annex II	Name	M/C/E	Method Used		SW1 (Outlet from Clear Water Pond)	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Cod	Designation or Description	Emission Point 1			
17	Arsenic and compounds (as As)	M	OTH	Composite sampler & analysed by ICP-MS	66.841	66.841	0.0	0.0
18	Cadmium and compounds (as Cd)	M	OTH	Composite sampler & analysed by ICP-MS	7.378	7.378	0.0	0.0
19	Chromium and compounds (as Cr)	M	OTH	Composite sampler & analysed by ICP-MS	7.378	7.378	0.0	0.0
20	Copper and compounds (as Cu)	M	OTH	Composite sampler & analysed by ICP-MS	7.882	7.882	0.0	0.0
23	Lead and compounds (as Pb)	M	OTH	Composite sampler & analysed by ICP-MS	39.966	0.0	0.0	0.0
12	Total nitrogen	M	OTH	Composite sampler & Spectrophotometric analysis	44259.109	44259.109	0.0	0.0
13	Total phosphorus	M	OTH	Composite sampler & analysed by ICP-MS	504.402	504.402	0.0	0.0
24	Zinc and compounds (as Zn)	M	OTH	Composite sampler & analysed by ICP-MS	774.595	774.595	0.0	0.0

\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

**SECTION B : REMAINING PRTR POLLUTANTS**

RELEASES TO WATERS								
POLLUTANT					Please enter all quantities in this section in KGs			
No. Annex II	Name	M/C/E	Method Used		SW1 (Outlet from Clear Water Pond)	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Cod	Designation or Description	Emission Point 1			
82	Cyanides (as total CN)	M	OTH	Composite sampler and analysed by Distillation & Colormetric Determination	184.44	184.44	0.0	0.0
21	Mercury and compounds (as Hg)	M	OTH	Composite sampler & analysed by Hydrate Generation / ICP	3.689	3.689	0.0	0.0

\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

**SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)**

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
Pollutant No.	Name	M/C/E	Method Used		SW1 (Outlet from Clear Water Pond)	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
			Method Cod	Designation or Description	Emission Point 1			
238	Ammonia (as N)	M	OTH	Composite sampler & Spectrophotometric analysis	11775.875	11775.875	0.0	0.0
205	Antimony (as Sb)	M	OTH	Composite sampler & analysed by ICP-MS	2026.947	2026.947	0.0	0.0
303	BOD	M	OTH	Composite sampler and 5 DAY BOD test	9037.537	9037.537	0.0	0.0
306	COD	M	OTH	Composite sampler and analysed by Distillation & Colormetric Determination	50779.735	50779.735	0.0	0.0
357	Iron	M	OTH	Composite sampler & analysed by ICP-MS	9.72	9.72	0.0	0.0
362	Kjeldahl Nitrogen	M	OTH	Composite sampler & Spectrophotometric analysis	14269.341	14269.341	0.0	0.0
324	Mineral oils	M	OTH	Composite sampler & Gas Chromatrography (GC-FID)	111.811	111.811	0.0	0.0
327	Nitrate (as N)	M	OTH	Composite sampler & Spectrophotometric analysis	28262.415	28262.415	0.0	0.0
372	Nitrite (as N)	M	OTH	Composite sampler & Spectrophotometric analysis	2497.076	2497.076	0.0	0.0
332	Ortho-phosphate (as PO4)	M	OTH	Composite sampler & Spectrophotometric analysis	4426.549	4426.549	0.0	0.0
343	Sulphate	M	OTH	Composite sampler & Gravimetric analysis	1574564.2	1574564.2	0.0	0.0
240	<b>Suspended Solids</b>	M	OTH	Composite sampler & Gravimetric analysis	36823.538	36823.538	0.0	0.0

\* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

e enter all quantities on this sheet in Tonnes

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
To Other Countries	15 01 10	Yes	7.774	empty grease tins / sill bottoms	R1	M	Weighed	Abroad	ENVA Ireland Limited,WCP-DC-08-116-01	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	Lindenschmidt KG,E97095037,Krombacher Str 42-26,57223,Kreuztal,"",Germany	Krombacher Str 42-26,57223,Kreuztal,"",Germany
To Other Countries	08 01 11	Yes	0.12	waste Paint/ paint cans	R3	M	Weighed	Abroad	ENVA Ireland Limited,WCP-DC-08-116-01	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	Nehlsen GmbH & Co. KG,D33300040,Riespot 4,28237 Bermen,"",",Germany Solvent Resource Management Limited,TP/3334/SF,Weeland Road,Knottingley,West Yorkshire,WF11 8DZ,United Kingdom	Riespot 4,28237 Bermen,"",",Germany
To Other Countries	11 01 13	Yes	0.689	degreasing wastes containing dangerous substances	R1	M	Volume Calculated	Abroad	Safety Kleen Ireland Limited,WCP-DC-09-1223-01	Unit 5,Airton Road,Tallagh,Dublin 24,Ireland	ENVA Ireland Limited,W0184-01,Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	Weeland Road,Knottingley,West Yorkshire,WF11 8DZ,United Kingdom
Within the Country	13 02 08	Yes	63.99	Waste Engine oil	R9	M	Volume Calculated	Offsite in Ireland	ENVA Ireland Limited,WCP-DC-08-116-01	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	ENVA Ireland Limited,W0184-01,Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland
Within the Country	13 05 08	Yes	41.2	mixtures of wastes from grit chambers and oil/water separators	R9	M	Volume Calculated	Offsite in Ireland	ENVA Ireland Limited,WCP-DC-08-116-01	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	ENVA Ireland Limited,W0184-01,Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland
To Other Countries	15 02 02	Yes	7.966	Solid Oily waste (rags / cloths)	D10	M	Weighed	Abroad	ENVA Ireland Limited,WCP-DC-08-116-01	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	KWA,E17012100,Graftstr,25 47475,Kamp-Linfort,"",Germany	Graftstr,25 47475,Kamp-Linfort,"",Germany
To Other Countries	15 02 02	Yes	14.13	Solid Oily waste (oil-dri)	R1	M	Weighed	Abroad	ENVA Ireland Limited,WCP-DC-08-116-01	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	Lindenschmidt KG,E97095037,Krombacher Str 42-26,57223,Kreuztal,"",Germany	Krombacher Str 42-26,57223,Kreuztal,"",Germany
To Other Countries	16 01 07	Yes	4.4	oil filters	R4	M	Weighed	Abroad	ENVA Ireland Limited,WCP-DC-08-116-01	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	R. D. Recycling,51727/1/KD,Centrum-Zuid,3017,Houthalen 3530,"",Belgium	Centrum-Zuid,3017,Houthalen 3530,"",Belgium
Within the Country	16 07 08	Yes	10.83	Oily Hoses	R4	M	Weighed	Offsite in Ireland	ENVA Ireland Limited,WCP-DC-08-116-01	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	Midland Scrap Metal Recycling,WMP 02/2008,Bellview Port,Waterford,"",",Ireland	Bellview Port,Waterford,"",",Ireland
To Other Countries	15 01 10	Yes	2.68	Copper Sulphate Packaging	R12	M	Weighed	Abroad	Eco-Safe Systems Limited,WCP-DC-09-1203-01	Unit 1A,Allied Industrial Estate,Kylemore Road,Dublin 10,Ireland	Lindenschmidt KG,E97095037,Krombacher Str 42-26,57223,Kreuztal,"",Germany	Krombacher Str 42-26,57223,Kreuztal,"",Germany
To Other Countries	15 01 10	Yes	0.471	Xanthate Liner Packaging	R12	M	Weighed	Abroad	Eco-Safe Systems Limited,WCP-DC-09-1203-01	Unit 1A,Allied Industrial Estate,Kylemore Road,Dublin 10,Ireland	Lindenschmidt KG,E97095037,Krombacher Str 42-26,57223,Kreuztal,"",Germany	Krombacher Str 42-26,57223,Kreuztal,"",Germany
To Other Countries	15 01 10	Yes	7.961	Contaminated plastic drums	R12	M	Weighed	Abroad	Eco-Safe Systems Limited,WCP-DC-09-1203-01	Unit 1A,Allied Industrial Estate,Kylemore Road,Dublin 10,Ireland	RECYFUEL S.A.,B-4480,Zoning Industrial d'Ehein,B-4480 Engis,"",",Belgium	Zoning Industrial d'Ehein,B-4480 Engis,"",",Belgium
To Other Countries	20 01 33	Yes	5.538	Lead Acid Batteries	R4	M	Weighed	Abroad	Eco-Safe Systems Limited,WCP-DC-09-1203-01	Unit 1A,Allied Industrial Estate,Kylemore Road,Dublin 10,Ireland	Nehlsen GmbH & Co. KG,D33300040,Riespot 4,28237 Bermen,"",",Germany	Riespot 4,28237 Bermen,"",",Germany
To Other Countries	20 01 35	Yes	2.862	discarded WEEE	R4	M	Weighed	Abroad	Eco-Safe Systems Limited,WCP-DC-09-1203-01	Unit 1A,Allied Industrial Estate,Kylemore Road,Dublin 10,Ireland	European Metal Recycling,EAWML/50447,Alexandra Dock 1,Bootle,Liverpool,L20 1BX,United Kingdom	Alexandra Dock 1,Bootle,Liverpool,L20 1BX,United Kingdom
To Other Countries	15 02 02	Yes	7.525	Filter Cloths	R12	M	Weighed	Abroad	Eco-Safe Systems Limited,WCP-DC-09-1203-01	Unit 1A,Allied Industrial Estate,Kylemore Road,Dublin 10,Ireland	RECYFUEL S.A.,B-4480,Zoning Industrial d'Ehein,B-4480 Engis,"",",Belgium	Zoning Industrial d'Ehein,B-4480 Engis,"",",Belgium
To Other Countries	18 01 03	Yes	0.019	Clinical Waste	D10	M	Weighed	Abroad	Eco-Safe Systems Limited,WCP-DC-09-1203-01	Unit 1A,Allied Industrial Estate,Kylemore Road,Dublin 10,Ireland	AGR mbH,E5625209,RZR herten,Im Emscherbruch 11,45699 Herten,"",Germany	RZR herten,Im Emscherbruch 11,45699 Herten,"",Germany

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
Within the Country	20 01 21	Yes	0.325	fluorescent tubes and other mercury-containing waste	R4	M	Weighed	Offsite in Ireland	Eco-Safe Systems Limited,WCP-DC-09-1203-01	Unit 1A,Allied Industrial Estate,Kylemore Road,Dublin 10,Ireland	Irish Lamp Recycling Co. Ltd.,WFP-KE-08-0348-01,Woodstock Industrial Estate,Kilkenny Road,Athy,County Kildare,Ireland	Woodstock Industrial Estate,Kilkenny Road,Athy,County Kildare,Ireland
To Other Countries	16 05 04	Yes	0.16	Aerosols	R4	M	Weighed	Abroad	ENVA Ireland Limited,WCP-DC-08-116-01	Clonminam Industrial Estate,Portlaoise,County Laois,"",Ireland	REMONDIS,H0903790,Brunnenstrabe 138,44536 Lunen,"",",",Germany	Brunnenstrabe 138,44536 Lunen,"",",",Germany
Within the Country	15 01 01	No	2.54	Explosive paper and cardboard packaging	R4	M	Weighed	Offsite in Ireland	Greenstar Knockharley Landfill,W0146-02	Knockharley,Kenstown,County Meath,"",Ireland		
To Other Countries	17 04 05	No	449.79	iron and steel	R4	M	Weighed	Abroad	European Metal Recycling,EAWML/50447	Alexandra Dock 1,Bootle,Liverpool,L20 IBX,United Kingdom		
To Other Countries	17 04 11	No	51.88	Mixed cable	R4	M	Weighed	Abroad	European Metal Recycling,EAWML/50447	Alexandra Dock 1,Bootle,Liverpool,L20 IBX,United Kingdom		
To Other Countries	17 04 11	No	61.44	Copper cable	R4	M	Weighed	Abroad	European Metal Recycling,EAWML/50447	Alexandra Dock 1,Bootle,Liverpool,L20 IBX,United Kingdom		
To Other Countries	16 01 06	No	4.14	end-of-life vehicle metals	R4	M	Weighed	Abroad	Stemcor UK Limited,ROC 3933	24 Chriswell Street,London,"",",",United Kingdom		
Within the Country	15 01 03	No	150.48	wooden packaging	R5	M	Weighed	Offsite in Ireland	Thornton Recycling Limited,NWCPO-09-01190-01	Killeen Road,Dublin 10,"",",",Ireland		
Within the Country	20 03 01	No	238.86	mixed municipal waste	D1	M	Weighed	Offsite in Ireland	White River Landfill (Louth County Council),WL0060-02	White River Landfill ,Dunleer,County Louth,"",Ireland		
Within the Country	16 01 03	No	111.4	end-of-life tyres	R4	M	Weighed	Offsite in Ireland	East Galway Waste Disposal Limited,WFP-G-11-0002-01	Lurgan,Killimore,Ballinasloe,County Galway,Ireland	Electrical waste management Limited,WFP-DS-11-0014-03,Greenogue Business Park,Block 648,Greenogue Business Park,Rathcoole County	Greenogue Buisness Park,Block 648,Greenogue Buisness Park,Rathcoole County Dublin,Ireland
Within the Country	20 03 01	No	136.42	mixed municipal waste	R12	M	Weighed	Offsite in Ireland	Indavur Ireland,W0167-02	Carranstown,Duleek,County Meath,"",Ireland		
Within the Country	20 01 01	No	16.02	paper and cardboard	R5	M	Weighed	Offsite in Ireland	AES,W0201-03	Clonmageddin,Proudstown Road,Navan,County Meath,Ireland		
Within the Country	20 03 01	No	7.46	Recycling waste	R13	M	Weighed	Offsite in Ireland	AES,W0104-02	Cappincur,Tullamore,County Offaly,"",Ireland		
Within the Country	20 01 08	No	4.35	biodegradable kitchen and canteen waste	R3	M	Weighed	Offsite in Ireland	Bord Na Mona Composting,W0201-03	Killinagh Upper,Carbury,County Kildare,"",Ireland		
To Other Countries	16 02 14	No	70.5	Decontaminated transformers	R4	M	Weighed	Abroad	SIMS Metal Management,EPR/FP3690VM	1NX,United Kingdom		
To Other Countries	17 04 11	No	0.04	Copper cable	R4	M	Weighed	Abroad	SIMS Metal Management,EPR/FP3690VM	1NX,United Kingdom		



Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used		Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
						M/C/E	Method Used					
To Other Countries	17 04 02	No	0.224	aluminium	R4	M	Weighed	Abroad	Howarth Metals,EPR/MB3832AC	22 Rondin Road,Ardwick,Manchester,M12 6BF,United Kingdom		
To Other Countries	17 04 07	No	32.26	mixed metals	R4	M	Weighed	Abroad	SN Seixal Siderurgica Nacional SA,07/01/2005	Fabrica Da Sexxal,Sede Alderia De Paio Pires,2840-96 Seixal,"",Portugal		
To Other Countries	17 04 05	No	0.282	iron and steel	R4	M	Weighed	Abroad	SN Seixal Siderurgica Nacional SA,07/01/2005	Fabrica Da Sexxal,Sede Alderia De Paio Pires,2840-96 Seixal,"",Portugal		
Within the Country	15 01 03	No	14.14	wooden packaging	R5	M	Weighed	Offsite in Irel	AES,W0201-03	Clonmageddin,Proudstown Road,Navan,County Meath,Ireland		
To Other Countries	17 04 11	No	42.04	Copper Cable	R4	M	Weighed	Abroad	Remet Metal Recycling,A826042786	9A Cody Business Park,Cody Road,London,E16 47L,United Kingdom		
<b>To Other Countries</b>	<b>17 04 05</b>	<b>No</b>	85.06	iron and steel	R4	M	Weighed	Abroad	Megasa Siderurgica SL,12276/RX667810	Carretera de Castilla 802-820,Naron,La Coruna,15570,Spain		
Within the Country	20 01 25	No	0.78	edible oil and fat	R1	M	Weighed	Offsite in Irel	Green BioFuels Ireland,P0829-01	Marshmeadows,New Ross,County Wexford,"",Ireland		

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## **Appendix 2**

### **AER Summary Templates**

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Facility Information Summary	
<b>AER Reporting Year</b>	2013
<b>Licence Register Number</b>	P0516-03
<b>Name of site</b>	Boliden Tara Miines Limited
<b>Site Location</b>	Knockumber, Navan, County Meath, Ireland
<b>NACE Code</b>	0729
<b>Class/Classes of Activity</b>	Class 1.3 (a) Minerals and Other Materials Class 1.3 (b) Minerals and Other Materials
<b>National Grid Reference (6E, 6 N)</b>	Mine Site: <i>E 284,877, N267,985</i> Tailings Management Facility: <i>E 285,100 N271,545</i>
<b>A description of the activities/processes at the site for the reporting year. This should include information such as production increases or decreases on site, any infrastructural changes, environmental performance which was measured during the reporting year and an overview of compliance with your licence listing all exceedances of licence limits (where applicable) and what they relate to e.g. air, water, noise.</b>	2.5 million tonnes of ore was mined in 2013 which yielded zinc and lead concentrates containing up to 298,000 tonnes of zinc and 38,600 tonnes of lead metal. This produced 2.2 million tonnes of waste otherwise called tailings. During 2013 there was no exceedance of any EVL. There was 28 external complaints received and one incident with potential for environmental impact.

**Declaration:**

All the data and information presented in this report has been checked and certified as being accurate. The quality of the information is assured

<p>_____</p> <p>Signature Group/Facility manager (or nominated, suitably qualified and experienced deputy)</p>	<p>_____</p> <p>Date</p>
--	--------------------------

**AIR-summary template**

Lic No: P0516-03

Year

2013

Answer all questions and complete all tables where relevant

Additional information

- 1 Does your site have licensed air emissions? If yes please complete table A1 and A2 below for the current reporting year and answer further questions. If **you do not have** licenced emissions and **do not complete a solvent management plan** (table A4 and A5) you do not need to complete the tables

Yes	
-----	--

**Periodic/Non-Continuous Monitoring**

- 2 Are there any results in breach of licence requirements? If yes please provide brief details in the comment section of TableA1 below

No	
Yes	

- 3 Was all monitoring carried out in accordance with EPA guidance note AG2 and using the basic air monitoring checklist? [Basic air monitoring checklist](#) [AGN2](#)

**Table A1: Licensed Mass Emissions/Ambient data-periodic monitoring (non-continuous)**

Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision therof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments -reason for change in % mass load from previous year if applicable
A2-4	Total Particulates	Monthly	10	No 30min mean can exceed the ELV	0.685	mg/Nm3	yes	ALT (EN13284-1:2002)	4.112	
A2-4	volumetric flow	Monthly	15,000	100 % of values < ELV	4803	Nm3/hour	yes	ALT (EN13284-1:2002)		
A2-4	Zinc and compounds (as Zn)	Monthly	0.5	No 30min mean can exceed the ELV	0.033	mg/Nm3	yes	EN 14385:2004	0.198	
A2-4	Arsenic and compounds (as As)	Monthly	0.05	No 30min mean can exceed the ELV	0.001	mg/Nm3	yes	EN 14385:2004	0.006	
A2-4	Cadmium and compounds (as Cd)	Monthly	0.05	No 30min mean can exceed the ELV	0.001	mg/Nm3	yes	EN 14385:2004	0.006	
A2-4	Lead and compounds (as Pb)	Monthly	0.5	No 30min mean can exceed the ELV	0.002	mg/Nm3	yes	EN 14385:2004	0.012	
A2-6	Total Particulates	Monthly	5	No 30min mean can exceed the ELV	0.29	mg/Nm3	yes	ALT (EN13284-1:2002)	827.7	
A2-6	volumetric flow	Monthly	775,000	100 % of values < ELV	336,822	Nm3/hour	yes	ALT (EN13284-1:2002)		
A2-6	Nitrogen oxides (NOx/NO2)	Monthly	20	No 30min mean can exceed the ELV	0.238	mg/Nm3	yes	EN 14792:2006	674.7	
A2-6	Hydrogen sulphide	Monthly	0.01	No 30min mean can exceed the ELV	0.001	mg/Nm3	yes	EN 13649:2001	28.3	
A2-7	Total Particulates	Monthly	5	No 30min mean can exceed the ELV	1.168	mg/Nm3	yes	ALT (EN13284-1:2002)	2731.7	

AIR-summary template										
				Lic No: P0516-03		Year		2013		
Emission reference no:	Parameter/ Substance	Frequency of Monitoring	ELV in licence or any revision thereof	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence limit	Method of analysis	Annual mass load (kg)	Comments -reason for change in % mass load from previous year if
A2-7	volumetric flow	Monthly	580,000	100 % of values < ELV	241,224	Nm3/hour	yes	ALT (EN13284-1:2002)		
A2-7	Nitrogen oxides (NOx/NO2)	Monthly	20	No 30min mean can exceed the ELV	0.43	mg/Nm3	yes	EN 14792:2006	1015	
A2-7	Hydrogen sulphide	Monthly	0.01	No 30min mean can exceed the ELV	0.01	mg/Nm3	yes	EN 13649:2001	23.4	
A2-8	Total Particulates	Monthly	5	No 30min mean can exceed the ELV	0.7	mg/Nm3	yes	ALT (EN13284-1:2002)	1493.9	
A2-8	volumetric flow	Monthly	580,000	100 % of values < ELV	241,224	Nm3/hour	yes	ALT (EN13284-1:2002)		
A2-8	Nitrogen oxides (NOx/NO2)	Monthly	20	No 30min mean can exceed the ELV	0.42	mg/Nm3	yes	EN 14792:2006	885.7	
A2-8	Hydrogen sulphide	Monthly	0.01	No 30min mean can exceed the ELV	0.01	mg/Nm3	yes	EN 13649:2001	21.3	
A2-9	Total Particulates	Monthly	5	No 30min mean can exceed the ELV	1.583	mg/Nm3	yes	ALT (EN13284-1:2002)	3921.6	
A2-9	volumetric flow	Monthly	775,000	100 % of values < ELV	336,822	Nm3/hour	yes	ALT (EN13284-1:2002)		
A2-9	Nitrogen oxides (NOx/NO2)	Monthly	20	No 30min mean can exceed the ELV	0.636	mg/Nm3	yes	EN 14792:2006	1575.8	
A2-9	Hydrogen sulphide	Monthly	0.01	No 30min mean can exceed the ELV	0.012	mg/Nm3	yes	EN 13649:2001	29.7	
A2-10	Total Particulates	Monthly	5	No 30min mean can exceed the ELV	1.184	mg/Nm3	yes	ALT (EN13284-1:2002)	3741.1	
A2-10	volumetric flow	Monthly	1,333,334	100 % of values < ELV	379,054	Nm3/hour	yes	ALT (EN13284-1:2002)		
A2-10	Nitrogen oxides (NOx/NO2)	Monthly	20	No 30min mean can exceed the ELV	0.31	mg/Nm3	yes	EN 14792:2006	985.8	
A2-10	Hydrogen sulphide	Monthly	0.01	No 30min mean can exceed the ELV	0.01	mg/Nm3	yes	EN 13649:2001	31.6	

Note 1: Volumetric flow shall be included as a reportable parameter

		Additional information
1	Does your site have licensed emissions direct to surface water or direct to sewer? If yes please complete table W2 and W3 below for the current reporting year and answer further questions. If you do not have licensed emissions you only need to complete table W1 and or W2 for storm water analysis and visual inspections	Yes
2	Was it a requirement of your licence to carry out visual inspections on any surface water discharges or watercourses on or near your site? If yes please complete table W2 below summarising any evidence of contamination noted during visual inspections	Yes A visual examination of site water management system is carried out daily. A log of inspections is maintained

**Table W2 Visual inspections-Please only enter details where contamination was observed.**

Location Reference	Date of inspection	Description of contamination	Source of contamination	Corrective action	Comments
			SELECT		

**Licensed Emissions to water and /or wastewater(sewer)-periodic monitoring (non-continuous)**

3	Was there any result in breach of licence requirements? If yes please provide brief details in the comment section of Table W3 below	No	Additional information
4	Was all monitoring carried out in accordance with EPA guidance and checklists for Quality of Aqueous Monitoring Data Reported to the EPA? If no please detail what areas require improvement in additional information box	Yes	Additional information

**Table W3: Licensed Emissions to water and /or wastewater (sewer)-periodic monitoring (non-continuous)**

Emission reference no:	Emission released to	Parameter/ SubstanceNote 1	Type of sample	Frequency of monitoring	Averaging period	ELV or trigger values in licence or any revision thereof <sup>Note 2</sup>	Licence Compliance criteria	Measured value	Unit of measurement	Compliant with licence	Method of analysis	Procedural reference source	Procedural reference standard number	Annual mass load (kg)
SW1	Water	volumetric flow		Continuous			No flow value shall exceed the specific limit.		m <sup>3</sup> /day	yes	On-line flow meter with recorder			
SW1	Water	pH		Continuous		6 - 9	No pH value shall deviate from the specified range.		pH units	yes	On-line pH Meter (Electrode)			
SW1	Water	Temperature		Continuous		1.5 oC	No temperature value shall exceed the limit value.		degrees C	yes	On-line Temperature probe (Electrode)			
SW1	Water	Dissolved Oxygen	composite	Daily			All results < 1.2 times ELV, plus 8 from ten results must be < ELV	7.49 (Annualised average)	mg/L	yes	On-line Dissolved Oxygen Meter (Electrode)			
SW1	Water	COD	composite	Weekly		100	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	13.71	mg/L	yes	Spectrophotometry (Colorimetry)			50779.735
SW1	Water	BOD	composite	Monthly		20	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	2.41	mg/L	yes	Other (BOD 5 Day test)			9037.537
SW1	Water	Suspended Solids	composite	Daily	24 hour	30	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	9.08 (Annualised average)	mg/L	yes	Gravimetric analysis	B.S. (British Standard)	6068	36823.538
SW1	Water	Ammonia (as N)	composite	Weekly	24 hour	<0.065 (	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	3.19 (Annualised average)	mg/L	yes	Spectrophotometry (Colorimetry)			11775.875
SW1	Water	Nitrate (as N)	composite	Weekly		50 (Drinking & Surface water Regs)	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	7.66 (Annualised average)	mg/L	yes	Spectrophotometry (Colorimetry)			28262.415
SW1	Water	Nitrite (as N)	composite	Weekly		0.5 (Drinking water Directive)	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	0.68 (Annualised average)	mg/L	yes	Spectrophotometry (Colorimetry)			2497.076
SW1	Water	Kjeldahl Nitrogen	composite	Weekly			All results < 1.2 times ELV, plus 8 from ten results must be < ELV	3.87 (Annualised average)	mg/L	yes	Spectrophotometry (Colorimetry)			14269.341
SW1	Water	Total nitrogen	composite	Weekly		50	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	12.06 (annualised average)	mg/L	yes	Spectrophotometry (Colorimetry)			44259.109
SW1	Water	Total phosphorus	composite	Weekly		2	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	<0.13 (Annualised average)	mg/L	yes	ICP / ICPMS (Inductively Coupled Plasma - Mass Spectrometry)			504.402
SW1	Water	Sulphate	composite	Weekly		1500	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	427 (Annualised Average)	mg/L	yes	Gravimetric analysis	APHA / AWWA "Standard Methods"	4500-SO <sub>4</sub> <sup>2-</sup> D	1574564.2
SW1	Water	Zinc and compounds (as Zn)	composite	Weekly		2	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	0.19 (Annualised average)	mg/L	yes	ICP / ICPMS (Inductively Coupled	APHA / AWWA "Standard Methods"	3125B	774.595
SW1	Water	Lead and compounds (as Pb)	composite	Weekly		0.5	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	<0.01 (Annualised Average)	mg/L	yes	ICP / ICPMS (Inductively Coupled	APHA / AWWA "Standard Methods"	3125B	39.966
SW1	Water	Copper and compounds (as Cu)	composite	Weekly		0.5	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	<0.002 (Annualised average)	mg/L	yes	ICP / ICPMS (Inductively Coupled	APHA / AWWA "Standard Methods"	3125B	7.882
SW1	Water	Iron	composite	Weekly		1	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	<0.003 (Annualised average)	mg/L	yes	ICP / ICPMS (Inductively Coupled	APHA / AWWA "Standard Methods"	3125B	9.72
SW1	Water	Cadmium and compounds (as Cd)	composite	Weekly		0.2	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	<0.002 (Annualised average)	mg/L	yes	ICP / ICPMS (Inductively Coupled	APHA / AWWA "Standard Methods"	3125B	7.378
SW1	Water	Arsenic and compounds (as As)	composite	Weekly		0.5	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	<0.018 (Annualised average)	mg/L	yes	ICP / ICPMS (Inductively Coupled	APHA / AWWA "Standard Methods"	3125B	66.841
SW1	Water	Antimony (as Sb)	composite	Weekly		1	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	0.466 (Annualised average)	mg/L	yes	ICP / ICPMS (Inductively Coupled	APHA / AWWA "Standard Methods"	3125B	2026.947
SW1	Water	Cyanides (as total CN)	composite	Weekly		0.2	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	<0.05 (Annualised average)	mg/L	yes	Distillation & Colorimetry	APHA / AWWA "Standard Methods"		184.44
SW1	Water	Chromium and compounds (as Cr)	composite	Weekly		1	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	<0.002 (Annualised average)	mg/L	yes	ICP / ICPMS (Inductively Coupled	APHA / AWWA "Standard Methods"	3125B	7.378
SW1	Water	Mercury and compounds (as Hg)	composite	Weekly		0.05	All results < 1.2 times ELV, plus 8 from ten results must be < ELV	<0.001 (Annualised average)	mg/L	yes	ICP / ICPMS (Inductively Coupled	APHA / AWWA "Standard Methods"	3125B	3.689

Note 1: Volumetric flow shall be included as a reportable parameter

Note 2: Where Emission Limit Values (ELV) do not apply to your licence please compare results against EQS for Surface water or relevant receptor quality standards

<b>Environmental Liabilities template</b>		Lic No: P0516-03
<a href="#">Click here to access EPA guidance on Environmental Liabilities and Financial</a>		

			Commentary
1	ELRA initial agreement status	Submitted and not agreed by EPA;	In 2013 in accordance with IPPCL P0516-03 Condition 12.2.2 a fully costed ELRA for both the Tara mine site and the Tailings Management Facility (TMF) was carried out.
2	ELRA review status	Review required and completed	The site ELRA ( <b>Alder Submission Reference LR005946</b> ) was submitted on 07/11/2013. The TMF ELRA ( <b>Alder Submission Reference LR006025</b> ) was submitted on 12/11/2013.
3	Amount of Financial Provision cover required as determined by the latest ELRA	Specify	The cost of unknown environmental liabilities relating to the TMF was €4,401,170 ( Risk - Major dam wall failure involving tailings flow slide). The cost of unknown environmental liabilities relating to the Tara site (Worst Case Scenario - leak in tailings carrying pipeline) is calculated at €1,212,622.56.
4	Financial Provision for ELRA status	Submitted and not agreed by EPA;	While in operation, unknown liabilities, including environmental liabilities, are covered under Tara's Business Interruption Insurance Policy. In Closure phase, Public Liability Insurance will be in place and for a 30 years aftercare period and has been costed in the reviewed CRAMP.
5	Financial Provision for ELRA - amount of cover	Specify	While in operation, the risk of unknown liabilities is covered under Tara's Business Interruption Insurance and covers potential environmental liabilities to the value of €25.0 million per individual event. In Closure and Aftercare management, the risk of unknown liabilities will be covered under Public Liability Insurance.
6	Financial Provision for ELRA - type	SELECT	While in operation, the risk of unknown liabilities is covered under Tara's Business Interruption Insurance and covers potential environmental liabilities to the value of €25.0 million per individual event. In Closure and Aftercare management, the risk of unknown liabilities will be covered under Public Liability Insurance.
7	Financial provision for ELRA expiry date	Enter expiry date	In revised CRAMP there is financial provision for 30 years aftercare management which includes provision for Public Liability Insurance.
8	Closure plan initial agreement status	Closure plan submitted and not agreed by EPA	A review of Tara's CRAMP was carried out and submitted on 07/03/2013 (Alder Case LR008327).
9	Closure plan review status	Review required and completed	
10	Financial Provision for Closure status	Submitted and not agreed by EPA;	Total Financial Provision for CRAMP is €13,746,557
11	Financial Provision for Closure - amount of cover	Specify	Cash and Bank Guarantee. The cash value of funding held as financial surety for the purpose of implementing CRAMP was €8.7 million as of 31st December 2013. In addition a Boliden Group sponsored Bank Guarantee for 5.0 million.
12	Financial Provision for Closure - type	Other please specify	The cash being held as financial surety for the purpose of implementing CRAMP is on deposit with Bank of Ireland through Meath County Council (MCC). There is a Boliden Group sponsored Bank Guarantee with MCC as beneficiary.
13	Financial provision for Closure expiry date	Enter expiry date	The revised CRAMP has made financial provision for 30 years aftercare management.

Environmental Management Programme/Continuous Improvement Programme template		Lic No:	P0516-03	Year	2013
Highlighted cells contain dropdown menu click to view		Additional Information			
1	Do you maintain an Environmental Management System (EMS) for the site. If yes, please detail in additional information	Yes			
2	Does the EMS reference the most significant environmental aspects and associated impacts on-site	Yes			
3	Does the EMS maintain an Environmental Management Programme (EMP) as required in accordance with the licence requirements	Yes			
4	Do you maintain an environmental documentation/communication system to inform the public on environmental performance of the facility, as required by the licence	Yes			

Environmental Management Programme (EMP) report					
Objective Category	Target	Status (% completed)	How target was progressed	Responsibility	Intermediate outcomes
Materials Handling/Storage/Bunding	Improve chemical storage. Relocation of Xanthate chemicals away from potential moisture sources (spontaneously combustible in presence of moisture.)	90%	New storage shed constructed to house bulk Xanthate chemicals.	Section Heads (Mill Manager & EHS Manager)	Improved Environmental Management Practices
Additional improvements	Increase retention time in water management ponds by dredging solids / sediment from Main Site Surface Drainage Pond	100%	Main Site Surface Drainage Pond emptied and solids removed to Processing plant	Section Heads (Mill Manager)	Improved Environmental Management Practices
Energy Efficiency/Utility conservation	Reduce water use	100%	Grinding water system converted to ABB process control. Control system change – during mill shutdown changed from continuous to On / Off control.	Section Heads (Mill Manager)	Improved Environmental Management Practices
Reduction of emissions to Water	Reduce concentration of Suspended Solids in mine water	100%	A Lamella water treatment plant was installed to improve the quality of mine water by reducing SS to <25mg/l. Plant was fully commissioned in 2Q 2013.	Section Heads (Mill Manager)	Reduced emissions
Additional improvements	Continuous backfill pour	100%	Continuous Backfill pour pipeline installed Surface infrastructure installed and leak testing completed.	Section Heads (Mill Manager & Mine Manager)	Improved Environmental Management Practices
Energy Efficiency/Utility conservation	To improve efficiency of dewatering the mine and improve pumping efficiency. Design and develop new Central Pump Station to collect all water from lower SWEX and have additional capacity in event of inrush of water	100%	A new central pumping station No 8 has been commissioned to collect all water from lower SWEX area.	Section Heads (Mine Manager & Mine Maintenance Manager)	Improved Environmental Management Practices



### Noise monitoring summary report

Lic No:

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Year

2013

1 Was noise monitoring a licence requirement for the AER period?

If yes please fill in table N1 noise summary below

Yes

2 Was noise monitoring carried out using the EPA Guidance note, including completion of the "Checklist for noise measurement report" included in the guidance note as table 6? [Noise Guidance note NG4](#)

Yes

3 Does your site have a noise reduction plan

No

4 When was the noise reduction plan last updated?

Dec-13

5 Have there been changes relevant to site noise emissions (e.g. plant or operational changes) since the last noise survey?

No

**Table N1: Noise monitoring summary**

Date of monitoring	Time period	Noise location (on site)	Noise sensitive location -NSL (if applicable)	LA <sub>eq</sub>	LA <sub>90</sub>	LA <sub>10</sub>	LA <sub>max</sub>	Tonal or Impulsive noise* (Y/N)	If tonal /impulsive noise was identified was 5dB penalty applied?	Comments (ex. main noise sources on site, & extraneous noise ex. road traffic)	Is site compliant with noise limits (day/evening/night) ?
04/12/2013	30 minutes Day-time		N1	64	58	66	74	No	SELECT	Road traffic noise from the old N3. Mine site emission less than L <sub>min</sub> of 49 dBA	Yes
03/12/2013	30 minutes Night-time		N1	50	40	48	72	No		Road traffic. Mine site emissions less than background of 40 dBA	Yes
04/12/2013	30 minutes Day-time		N2	53	49	53	71	No		Road traffic noise from the old N3. Mine site emission less than L <sub>min</sub> of 45 dBA	Yes
03/12/2013	30 minutes Night-time		N2	46	43	49	62	No		Road traffic. Mine site emissions less than background of 43 dBA	Yes
04/12/2013	30 minutes Day-time		N3	47	42	50	67	No		Road traffic noise from the old N3. Mine site emission less than L <sub>min</sub> of 40 dBA	Yes
02/12/2013	30 minutes Night-time		N3	41	35	42	58	No		Road traffic. Mine site emissions less than background of 35 dBA	Yes
04/12/2013	30 minutes Day-time		N4	45	42	48	72	No		Road traffic noise from the old N3. Mine site emission less than L <sub>min</sub> of 39 dBA	Yes
02/12/2013	30 minutes Night-time		N4	38	32	41	63	No		Road traffic. Mine site emissions inaudible less than background of 32 dBA	Yes
04/12/2013	30 minutes Day-time		M1	45	38	46	69	No		Road traffic noise from the old N3. Tara site emission inaudible at < 38 dBA	Yes
03/12/2013	30 minutes Night-time		M1	39	32	42	49	No		Distant road traffic. Tara actively inaudible at less than background of 32 dBA	Yes
04/12/2013	30 minutes Day-time		M2	46	41	49	65	No		Road traffic noise from the old N3. Tara site emission inaudible at < 41 dBA	Yes
03/12/2013	30 minutes Night-time		M2	39	28	35	53	No		Distant road traffic. Tara actively inaudible at less than background of 28 dBA	Yes
04/12/2013	30 minutes Day-time		M3	45	39	47	72	No		Road traffic noise from the old N3. Tara site emission inaudible at < 39 dBA	Yes
03/12/2013	30 minutes Night-time		M3	35	25	38	68	No		Distant road traffic. Tara actively inaudible at less than background of 25dBA	Yes
04/12/2013	30 minutes Day-time		M4	42	34	45	62	No		Road traffic noise from the old N3. Tara site emission inaudible at < 34 dBA	Yes
04/12/2013	30 minutes Night-time		M4	35	27	36	49	No		Distant road traffic. Tara actively inaudible at less than background of 27 dBA	Yes
04/12/2013	30 minutes Day-time		M5	45	35	49	68	No		Road traffic noise from the old N3. Tara site emission inaudible at < 35 dBA	Yes
04/12/2013	30 minutes Night-time		M5	36	28	39	58	No		Distant road traffic. Tara actively inaudible at less than background of 28 dBA	Yes
04/12/2013	30 minutes Day-time		M6	43	36	46	78	No		Road traffic noise from the old N3. Tara site emission inaudible at < 36 dBA	Yes
04/12/2013	30 minutes Night-time		M6	36	24	38	65	No		Distant road traffic. Tara actively inaudible at less than background of 24 dBA	Yes
04/12/2013	30 minutes Day-time		M7	48	37	50	76	No		Road traffic noise from the old N3. Tara site emission inaudible at < 37 dBA	Yes
04/12/2013	30 minutes Night-time		M7	38	23	40	67	No		Distant road traffic. Tara actively inaudible at less than background of 23 dBA	Yes

\*Please ensure that a tonal analysis has been carried out as per guidance note NG4. These records must be maintained onsite for future inspection

- 1 When did the site carry out the most recent energy efficiency audit? Please list the recommendations in table 3 below  
Is the site a member of any accredited programmes for reducing energy usage/water conservation such as the SEAI programme linked to the right? If yes please list them in additional information
- 2
- 3 Where Fuel Oil is used in boilers on site is the sulphur content compliant with licence conditions? Please state percentage in additional information

Additional information	
2013	
Yes	Agreements Programme
Yes	<1%

Table R1 Energy usage on site				
Energy Use	Previous year	Current year	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*
Total Energy Used (MWHrs)	231,179.5	225,698.30	-0.36%	-1.54%
Total Energy Generated (MWHrs)				
Total Renewable Energy Generated (MWHrs)				
Electricity Consumption (MWHrs)	186,906.2	183,395		
Fossil Fuels Consumption:				
Heavy Fuel Oil (m3)				
Light Fuel Oil (m3)	1,407.1	3916.590		
Natural gas (m3)	5.3	5.1		
Coal/Solid fuel (metric tonnes)				
Peat (metric tonnes)				
Renewable Biomass				
Renewable energy generated on site				

\* where consumption of energy can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

\*\* where site production information is available please enter percentage increase or decrease compared to previous year

Table R2 Water usage on site					Water Emissions	Water Consumption	
Water use	Water extracted Previous year m3/yr.	Water extracted Current year m3/yr.	Production +/- % compared to previous reporting year**	Energy Consumption +/- % vs overall site production*	Volume Discharged back to environment(m <sup>3</sup> /yr):	Volume used i.e not discharged to environment e.g. released as steam m3/yr	Unaccounted for Water:
Groundwater	4,760,432	4,783,632					
Surface water	1,200	3,000			3,688,791		
Public supply	108,032	101,781					
Recycled water	7,028,022	7,080,786					
Total							

\* where consumption of water can be compared to overall site production please enter this information as percentage increase or decrease compared to the previous reporting year.

\*\* where site production information is available please enter percentage increase or decrease compared to previous year

## sage/Energy efficiency summary

Lic No:

P0516-03

Year

2013

Table R4: Energy Audit finding recommendations								
Date of audit	Recommendations	Description of Measures proposed	Origin of measures	Predicted energy savings %	Implementation date	Responsibility	Completion date	Status and comments
Jan 2014	Heat Recovery from Mill cooling water circuit.	Ground source heat pumps to provide hot water for showers and space heating for mine dry.	Opportunities Register	100% saving of heating oil used in Mine Dry (approx 160,000 litres per year.	Q2 2014	Energy Manager / Energy Team	In progress	Final feasibility and budget being prepared
March 2014	Investigate heat recovery from Mine Dry shower waste water.	Recoup Drain + shower water heat recovery system	SEAI Energy Show	To be determined	Q4 2014	AW/Tony Hand Task G	In progress	Feasibility study to be carried out
March 2014	Replace office T5 lights with LED	Investigate LED light replacement technology	SEAI Energy Show	To be determined	Q3 2014	AW/Tony Hand Task G	In progress	Feasibility study to be carried out

**i Incidents summary template**

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**Complaints**

Have you received any environmental complaints in the current reporting year? If yes please complete summary details of complaints received on site in table 1 below

Yes

Additional information

All complaints received are fully investigated

**Table 1 Complaints summary**

Date	Category	Other type (please specify)	Brief description of complaint (Free txt <20 words)	Corrective action< 20 words	Resolution status	Resolution date	Further information
22/02/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 22/02/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	25/02/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
28/03/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 28/03/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	29/03/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
09/04/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 09/04/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	11/04/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
09/04/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 09/04/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	11/04/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
09/04/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 09/04/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	11/04/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
12/04/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 12/04/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	15/04/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
12/04/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 12/04/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	15/04/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
12/04/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 12/04/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	15/04/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
17/04/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 17/04/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	19/04/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
05/06/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 05/06/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	07/06/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
05/06/2013	Noise	Noise	Noise coming from site activities between 11:45pm and 01:25am on 05/06/2013.	Confine activity to day hours. If a requirement to work late reduce potential noise impacts.	Complete	07/06/2013	Activity was not routine.
12/06/2013	SELECT	TMF Extension Height	Complaint alleged the height of extension to TMF has extended over 4m above dam wall.	Embankment wall is being grassed. Independent survey of wall is being carried out.	Complete	14/06/2013	
16/06/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 16/06/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	17/06/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
16/06/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 16/06/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	17/06/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
01/08/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 01/08/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	05/08/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
27/08/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 27/08/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	29/08/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
18/09/2013	Water	Water loss	Loss of water in domestic well.	Inspected well. Provided temporary supply of water. Will monitor well recovery.	Complete	20/09/2013	
10/10/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 10/10/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	14/10/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
10/10/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 10/10/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	14/10/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.

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10/10/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 10/10/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	14/10/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
13/10/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 13/10/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	14/10/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
15/10/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 15/10/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	17/10/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
17/10/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 17/10/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	18/10/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
19/10/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 19/10/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	21/10/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
14/11/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 14/11/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	15/11/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
14/11/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 14/11/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	15/11/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
28/11/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 28/11/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	29/11/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
13/12/2013	SELECT	Ground vibration	Ground vibration experienced at residence relating to blasting on 13/12/2013.	All blasts are designed to generate low levels of ground vibration at receptors.	Complete	16/12/2013	There is continuous ground vibration monitoring being carried out at locations which represent levels at this receptor. Blast vibration levels are kept well below the IPPCL Limit of 8mm/sec daytime & 4mm/sec night-time.
Total complaints open at start of reporting year	None						
Total new complaints received during reporting year	28						
Total complaints closed during reporting year	28						
Balance of complaints end of reporting year	None						

**Incidents**

Have any incidents occurred on site in the current reporting year? Please list all incidents for current reporting year in Table 2 below

Yes

\*For information on how to report and what constitutes an incident

[What is an incident](#)

**Table 2 Incidents summary**

Date of occurrence	Incident nature	Location of occurrence	Incident category*please refer to guidance	Receptor	Cause of incident	Other cause (please specify)	Activity in progress at time of incident
05/09/2013	Uncontrolled release	Other location (leak on tailings distribution pipeline on wall of Stage 5A at Randalstown TSF)	1. Minor	No vulnerable receptor, released into Stage 5A dam	Plant or equipment issues	Movement (Expansion and contraction) in pipeline due to temperature change	Normal activities
Total number of incidents current year	1						
Total number of incidents previous year	12						
% reduction/increase	91.7% reduction in incidents in 2013 from 2012						

Year	2013
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Communication	Occurrence	Corrective action <20 words	Preventative action <20 words	Resolution status	Resolution date	Likelihood of reoccurrence
EPA (Incident INC1002286)	New	Pipeline repaired	Pipeline covered with soil	Complete	26/09/2013	Low