

**Broken Hill Operations Pty Ltd** ABN 95 103 555 862

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# **Annual Environmental Management Report**



**PERIOD: 1 April 2014 to 16 December 2014**

**TITLE BLOCK**

<b>Name of Mine:</b>	<b>Rasp Mine</b>
<b>Mining Titles / Leases:</b>	<b>Consolidated Mining Lease 7, Broken Hill</b>
	<b>MPLs 183, 184, 185, 186</b>
<b>MOP Commencement Date 16/12/14</b>	<b>MOP Completion date 31/10/15</b>
<b>AEMR Commencement Date 1/04/14</b>	<b>AEMR End Date 16/12/14</b>
<b>Name of Leaseholder:</b>	<b>Broken Hill Operations Pty Ltd</b>
<b>Name of Mine Operator:</b>	<b>Broken Hill Operations Pty Ltd</b>
<b>Reporting Officer:</b>	<b>Leonard Sharp</b>
<b>Title</b>	<b>Environment Officer</b>
<b>Signature</b>	 .....
<b>Date</b>	<b>22/05/2015</b>

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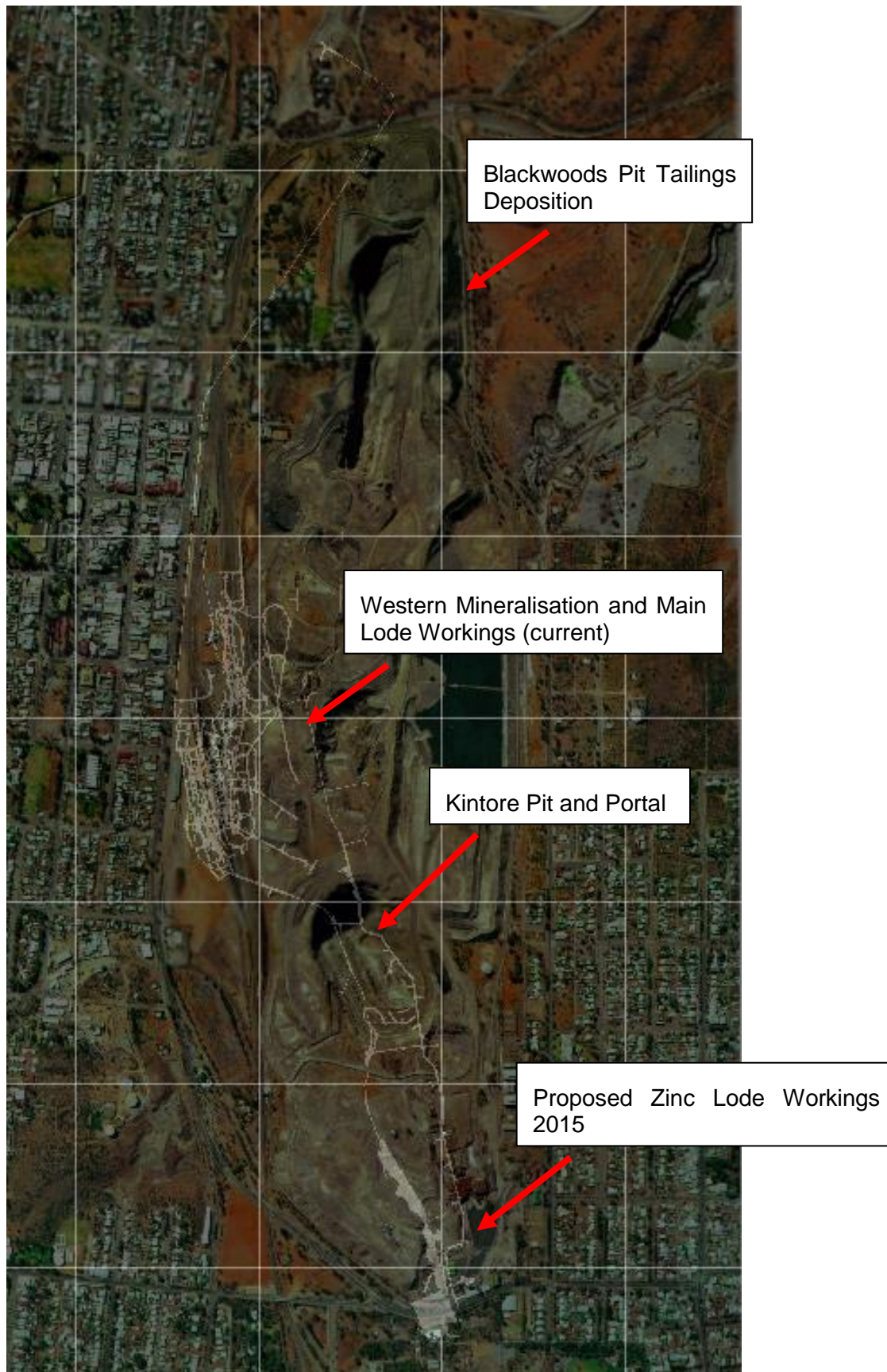
## **Plans**

BHOP acknowledge the plans currently shown do not meet ESG3 section 11. These plans are currently being produced by a consultant as part of the Mine Closure Plan. The Mine Closure Plan is due for submission June 30, 2015 as per email sent to DRE 10/03/2015.

## **Land Preparation**

No clearing of undisturbed land was undertaken during the reporting period.

## Mining Activities

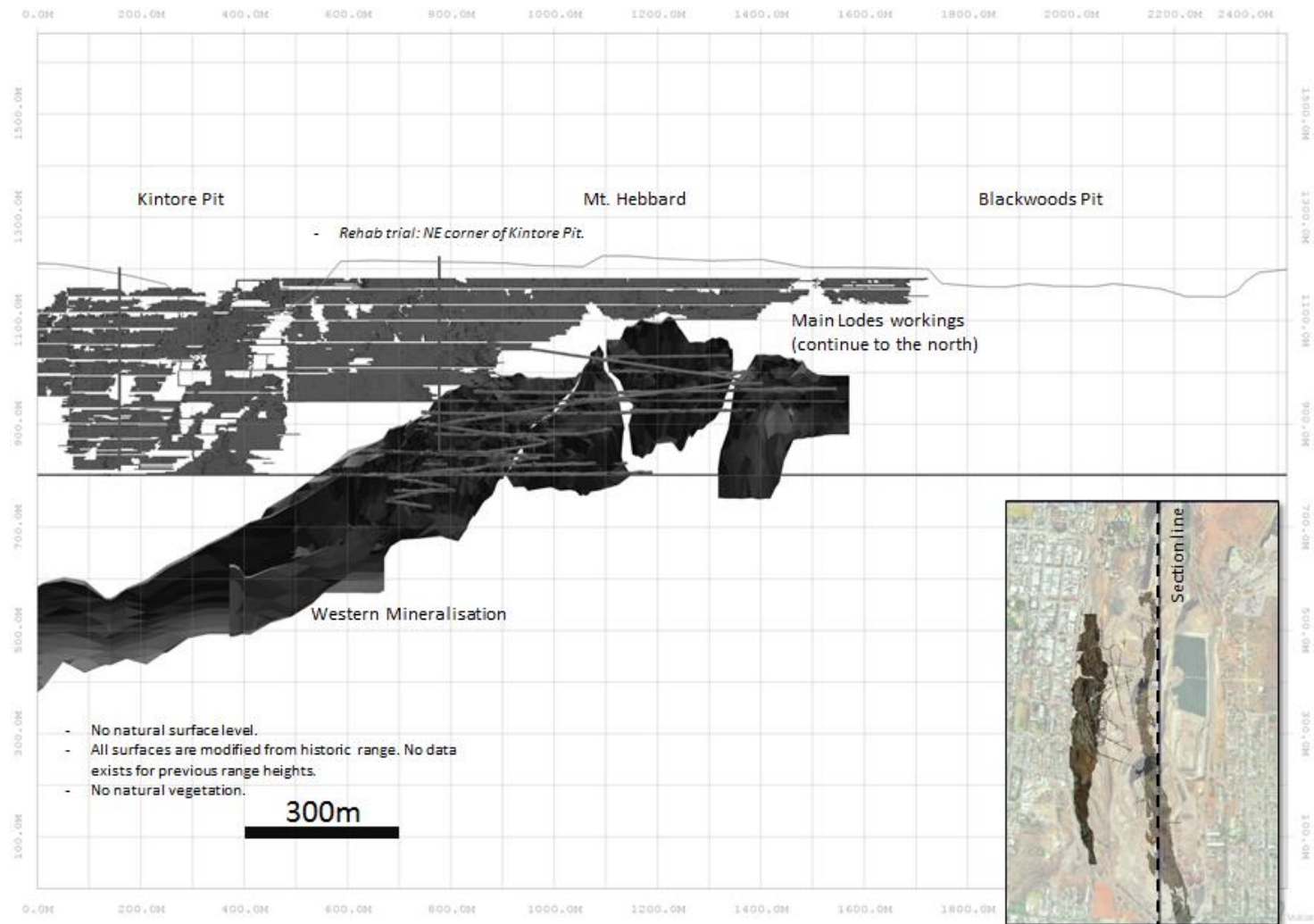




## **Rehabilitation**

No planned rehabilitation activities were undertaken during the reporting period

## Vertical Sections



## 1. INTRODUCTION

Broken Hill Operations Pty Ltd (BHOP) (a wholly owned subsidiary of CBH Resources Ltd (CBH)), purchased the Rasp Mine from Normandy Mining Investments in 2001 (NMI). The Rasp Mine consists of the Consolidated Mining Lease 7 (CML7) and Mining Purpose Leases 183, 184, 185 and 186. These leases occupy a central region of the historic Broken Hill Line of Lode ore body and incorporate the original mine areas that commenced operations in the 1880s including a substantial amount of mining infrastructure from various mining phases.

The Rasp Mine is located centrally within the City of Broken Hill and is surrounded by transport infrastructure, areas of commercial and industrial development and some residential housing. The Rasp Mine is bounded by Eyre Street and Holten Drive to the south and east, Menindee Road (MR 66) to the northeast, Crystal Street to the northwest and Bonanza Street and South Road (Silver City Highway SH 22) to the southwest. Residential and commercial areas are located to the west, south and north of CML7, Perilya mine developments to the north-east (North Mine) and south-west (Southern Operations) and the Blue Metal Quarry to the east. An aerial view of the Rasp Mine is provided in Figure 1.

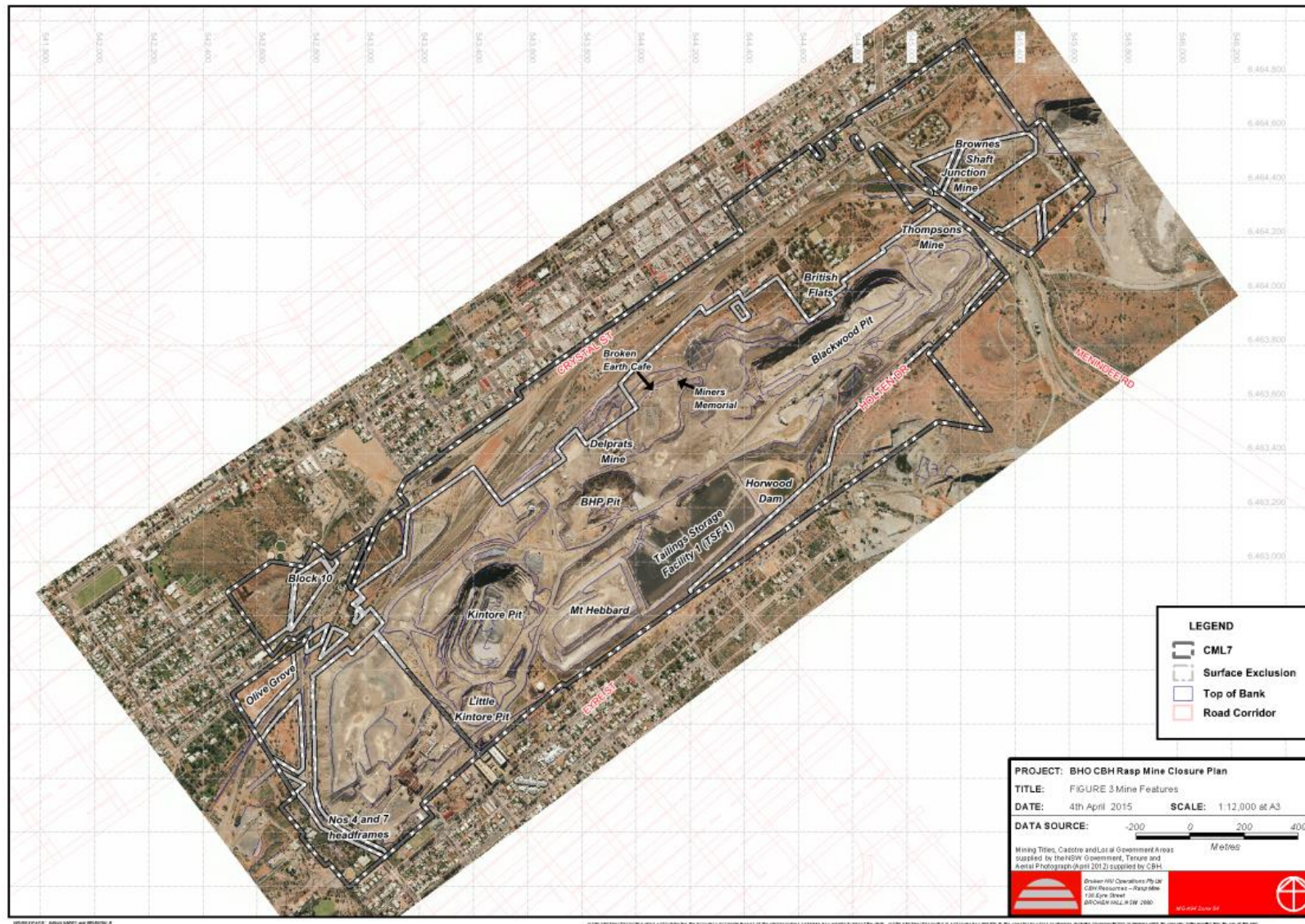


Figure 1: Aerial Overview, Rasp Mine

Rasp Mine

## 1.1 Consents, Leases and Licences

Table 1 provides a list of development consents held by Rasp Mine.

**Table 1: Development Consents**

Approval Number	Date Issued	Duration	Purpose
DA 125/2001	5 <sup>th</sup> Sept 2002	Work completed	Surface drilling on CML7 in surface exclusion zone (near rail), supported by a SEE.
MOP 06/6463	26 <sup>th</sup> Oct 2006	31 <sup>st</sup> Aug 2008	Construct exploration decline, conduct drilling and obtain bulk sample, supported by a REF.
DA 101/2007	26 <sup>th</sup> April 2007	Work completed	Undertake temporary mining in the Kintore Pit, supported by a SEE.
MOP Amendment 06/6436	5 <sup>th</sup> May 2008	31 <sup>st</sup> Oct 2008	Extend the exploration decline.
MOP 06/6463	16 <sup>th</sup> Dec 2009	31 <sup>st</sup> Dec 2010 Extended to 31 <sup>st</sup> March 2011	For underground mining and stockpiling 120,000 tpa, supported by a REF.
DA 264/2009	19 <sup>th</sup> Jan 2010	2 <sup>nd</sup> Feb 2011	For ancillary surface mining activities including crushing, stockpiling and transport of ore, supported by a SEE.
Part 3A Application 07_0018	31 <sup>st</sup> Jan 2011	31 <sup>st</sup> Dec 2026	Mining production of 750,000 tpa from Western Mineralisation, Centenary Mineralisation and Main Lode Pillars. Construction and operation of minerals processing plant and rail load out facility. Supported by an EAR.
MOP 0111	31 <sup>st</sup> Jan 2011	31 <sup>st</sup> Dec 2026	Mining production of 750,000 tpa from Western Mineralisation, Centenary Mineralisation and Main Lode Pillars. Operation of a minerals processing plant and rail load out facility. Supported by an EAR.

Table 2 presents the mineral authorities held by BHOP in the vicinity of the Rasp Mine. For the purposes of this document, the area covered by CML7 and MPLs 183, 184, 185 and 186 is referred to as the "Rasp Mine".

**Table 2: Mineral Authorities**

Mineral Authority	Grant Date	Last Renewed	Renewal Date	Holder	Purpose
CML7	8 <sup>th</sup> Oct 1987	17 <sup>th</sup> Jan 2007	31 <sup>st</sup> Dec 2026	BHOP	As per Schedule 2 of the Lease Open cutting, shaft sinking, stoping, tunnelling, building of dams, extraction and obtaining minerals, generation of electricity, erecting dwellings, storage of fuels, dumping of ore, treatment and dumping of tailings, development of roads
MPL 183	4 <sup>th</sup> Feb 1981	24 <sup>th</sup> Apr 2007	31 <sup>st</sup> Dec 2026	BHOP	Dumping of ore and mine residues, treatment of tailings
MPL 184	4 <sup>th</sup> Feb 1981	24 <sup>th</sup> Apr 2007	31 <sup>st</sup> Dec 2026	BHOP	Dumping of ore and mine residues, treatment of tailings
MPL 185	4 <sup>th</sup> Feb 1981	24 <sup>th</sup> Apr 2007	31 <sup>st</sup> Dec 2026	BHOP	Dumping of ore and mine residues, treatment of tailings
MPL 186	4 <sup>th</sup> Feb 1981	24 <sup>th</sup> Apr 2007	31 <sup>st</sup> Dec 2026	BHOP	Dumping of ore and mine residues, treatment of tailings

Table 3 presents the licences held by BHOP in relation to the Rasp Mine.

**Table 3: Licences Held**

Table 6: Licences Held											
Licence / Permit	Issued By	Date of Expiry/ Renewal	Purpose								
EPL 12559	EPA	Upon surrender, suspension or revocation	Crushing , grinding or separating >500,000 – 2,000,000T processed. Mining for minerals >500,000 – 2,000,000T produced.								
Dangerous goods XSTR100095	Work Cover	Feb 2017	Storage and use of dangerous goods. <table><tr><th>Class of explosives</th><th>Max quantity</th></tr><tr><td>1.1D</td><td>5,000 Kg</td></tr><tr><td>1.1B</td><td>50,500 Kg</td></tr><tr><td>5.1</td><td>25,000 Kg</td></tr></table>	Class of explosives	Max quantity	1.1D	5,000 Kg	1.1B	50,500 Kg	5.1	25,000 Kg
Class of explosives	Max quantity										
1.1D	5,000 Kg										
1.1B	50,500 Kg										
5.1	25,000 Kg										
Diesel storage UN 00C1	Work Cover	Feb 2017	Storage of 150,000 L of Diesel								

<b>Licence / Permit</b>	<b>Issued By</b>	<b>Date of Expiry/ Renewal</b>	<b>Purpose</b>
Water extraction 85WA752823	NOW	May 2017	Permission given for exemption from water extraction embargo.
Radiation RML43782	EPA	July 2014	Current licence to sell and/ or possess radiation apparatus. Sell and/ or possess radioactive substances or items containing radioactive substances.



## 1.2 Mine Contacts

The contact names and phone numbers for key personnel are listed in Table 4, together with the telephone number of the Rasp Mine Complaint Line, as required by EPL 12559.

**Table 4: Mine Contacts**

Name	Title	Contact Details
Visko Sulicich	BHOP Director  CBH Chief Operating Officer	T: 08 8088 9106  <a href="mailto:viskosulicich@cbhresources.com.au">viskosulicich@cbhresources.com.au</a>
Robert Williamson	BHOP General Manager	T: 08 8088 9157  <a href="mailto:Robwilliamson@cbhresources.com.au">Robwilliamson@cbhresources.com.au</a>
Costa Papadopoulos	BHOP Manager of Health, Safety & Environment	T: 08 8088 9126  <a href="mailto:costapapadopoulos@cbhresources.com.au">costapapadopoulos@cbhresources.com.au</a>

## 1.3 Actions Required at Previous AEMR Review

At the time of writing BHOP had not received any feedback on the previous AEMR (2013-2014).

# 2. OPERATIONS DURING THE REPORTING PERIOD

## 2.1 Exploration

There has been no surface exploration drilling conducted during the reporting period.

## 2.2 Land Preparation

### ***Topsoil and Subsoil Stockpiles***

No topsoil or subsoil stockpiles were established or maintained during the reporting period.

### ***Surface disturbance***

No new ground has been disturbed during the reporting period. Surface expressions of mined waste are confined to the waste rock dump within Kintore Pit and the in pit tailings dam at Blackwods Pit.

Works to increase the height of bunding along the haul road progressed during this time and were almost complete by the end of 2014. Waste rock from underground was used to



increase the height of the eastern bund on the haul road. The geometric mean lead and zinc concentration in the waste rock was 0.2%.

## **2.3 Construction**

### ***New buildings / structures***

No new buildings or structures were erected during the reporting period.

### ***Roads and fencing***

No new roadways or fencing were constructed during the reporting period. Routine maintenance of the haul road was conducted to ensure its longevity. Boundary fencing was also inspected and repaired as required.

## **2.4 Mining**

### ***Mine Access***

Mining is conducted underground and is accessed through the existing portal located at the northern end of the Kintore Pit. Mining activities include mining of the Western Mineralisation and Main Lode Pillars.

Mining activities were undertaken as follows and met the requirements of the Development Consent:

- Truck haulage from underground to ROM pad 24 hours per day, 7 days per week
- Production rock blasting between 6.45 am to 7.15 pm, 7 days per week
- Development blasting concurrently with production blasting where practicable
- Independent development firing below the 10 level, 7 days per week at any time
- Ventilation fans, 24 hours per day, 7 days per week
- Underground operations, 24 hours per day, 7 days per week

### ***Underground decline development***

The current Rasp Decline has been developed between the Western Mineralisation and the Main Lodes, with a secondary decline to be developed providing additional access to the Main Lode stoping. During the reporting period the decline was extended by 205.1m linearly and 21.93 m vertically.

Ore and waste was excavated using load haul dump (LHD) equipment and transported to loading points where mine trucks transported ore to the ROM pad. Waste was used in underground back fill operations with some waste rock being retained and stored in the Kintore Pit for temporary storage.

A total of 21 stopes have been mined with 613,719t of ore coming from those stopes listed in Table 5.

**Table 5: Mined Stopes 2014**

<b>Western Mineralisation and Main Lode Stopes</b>		
WM_7_3	WM-7-5	WM_8_5
WM_8_4	WM_9_1	WM_10_2
WM_10_4	WM_6_4	WM_5_2
WM_9_3_UH	WM_7_4	WM_6_2
WM_6_1	WM_7 SUB 1	WM_10_3_UH/DH
WM_8_3_UH/DH	WM_12_3_A_UH/DH	WM_12_3_B_UH/DH – Still in production
WM_11_1_UH – Still in production	MLD_525_1	MLD_525_WP –Still in Production

***Mining Method and Sequence***

The mining of mineral ore is limited to underground workings.

A variety of production methods are utilised, including long-hole open stoping (LHOS), uphole benching, room and pillar and uphole pillar retreat mining. LHOS is the most prevalent method used in the Western Mineralisation, uphole stoping, with room and pillar and uphole pillar retreat in the Main Lode Pillars.

The ore is blasted using a bulk emulsion explosive and extracted using load haul dump vehicles (LHD's) either conventionally or under remote control.

***Void Backfilling***

Waste rock was used for backfill in mined out stopes. Over the next reporting period more waste will be back filled underground as more stopes become available. The backfill plant was not operational during the reporting period as the cost to complete its construction could not be justified in the current life cycle of the mine.

***Tailings Deposition***

A total of 368,494t of tailings was produced during the reporting period. All tailings have been stored in TSF2 (Blackwoods Pit). Water is pumped from TSF2 and re used throughout the processing facility.

***Ore and Product Stockpiles***

All ore is transported by truck and stored at the ROM facility before being put through the processing plant. The ROM pad is 32m by 80m as indicated in the MOP. The ROM is also surrounded by 5m wind breaks and has additional water sprays to control dust.

Mine production for the reporting period is provided in Table 6. Kintore Pit stockpiles for back fill were kept at a minimum during the reporting period. All ore on the ROM stockpile including low grade stockpiles were processed. No more than a week's processing was kept on the ROM stockpile at any one time. Table 6 provides a summary of production from the start of the AEMR reporting period to end of the reporting period with the figures being the total cumulative amount since mining commenced. The amount of waste rock and ore

produced was less than indicated in the MOP as production and personnel were reduced to increase the viability of the mine.

**Table 6: Production and Waste Summary**

Item	Total Production Tonnes
Topsoil Stripped	N/A
Topsoil Spread	N/A
Ore Tonnes Mined: Dry Tonnes	412,511
Stope Mucking: Dry Tonnes	330,189
Dev Ore Bugged: Dry Tonnes	78,465
Stope Tonnes Fires: Tonnes	378,258
Waste Backfill (UG Rock Places): Tonnes	158,875
Waste Trucked to Surface: Tonnes	114,792

## 2.5 Mineral Processing

Processing of ore from the Rasp mine, has single stage crushing, two stage grinding and differential flotation, including concentrate regrind, to produce separate lead and zinc concentrates. Concentrates are dewatered using thickeners and filters, the filtered concentrates are conveyed directly into concentrate containers for rail transport to a shipping port.

A summary of mineral processing operations for the reporting period are presented below in Table 7.

**Table 7: Mineral Processing Summary (April 2014 to December 2014)**

Activity/Element	Total Tonnes Produced
Milled tonnes	409,969
PB Con	13,718
Zn Con	27,756
Tailings	368,494

A total of 409,969 t of ore was milled with a yield of 13,718t of lead and 27756t of Zinc during the reporting period. There was a total of 368,494t of tailings produced which was deposited in TSF 2. During this time the processing plant operated on a campaign basis with processing occurring three weeks of the month with the fourth being a shutdown week for routine maintenance.

## 2.6 Waste Management

Waste management at the mine is classified into two broad categories: mineral wastes (mining and mineral processing wastes), and non-mineral wastes which include recyclables and non-recyclables.

## Mineral Waste

### 2.6.1 Tailings

Process tailings from the process plant is primarily deposited into the Blackwoods pit TSF, Figure 2. This is via a ring main and is done in such a manner to beach the tailings and reclaim water for re-use in the process plant from the northern end. In addition it is designed to be able to maintain some moisture and never completely dry as to reduce dust.

In the reporting period the Back fill plant was not commissioned. Meaning that no tailings were able to be used as underground fill and reduce the overall speed that the Blackwoods TSF fills.

There is approximately 1,486,064m<sup>3</sup> of remaining storage volume in Blackwoods Pit and at the current milling rate of 500,000 tonnes per year the pit has 4.9 years remaining life assuming a uniform density of 1.65 tonnes/m<sup>3</sup>.

The tailing contains the following elements by percentage volume: Lead 0.27%, Zinc 0.31%, Cu 0.01% and Iron 2.74%. Silver is also present at 5.05g/t.



Figure 2: TSF 2, Blackwoods Pit

#### 2.7.1.1 Waste Rock

Waste rock generated from the underground mine is generally reused immediately underground as backfill. There is a surface waste rock stockpile located in the Kintore pit. During the reporting period 114,792 tonnes of waste rock was transported to the surface stockpiles. The waste rock originates from previous underground workings namely the upper decline bypass. Uses for the waste rock include crushing and screening for road base where required. Waste rock is likely to be used during the life of mine or can be utilised for TSF rehabilitation.

If waste rock is needed for use on the surface, such as for bund walls, it is tested in accordance with the waste rock management procedure. The rock must undergo geometric assessment to establish its lead and zinc concentration and have a combined concentration of less than 1% for the stockpile.

### ***Non-Mineral Waste Recyclables***

#### ***Laydown area***

Rasp Mine has four main laydown areas where used parts and equipment are stored for future use.

The recyclable area is sign posted with dedicated sections for scrap metal, timber, batteries, rubber, electronic goods and used pods.

#### ***Hydrocarbons***

Used hydrocarbons are handled and processed at the waste hydrocarbon depot. The facility handles used oil, grease, oily rags, oil filters and hydrocarbon contaminated items.

Volumes of material sent off site are shown in Table 8.

#### ***Other Recyclables***

Other recyclables include office paper, cardboard, printer cartridges and scrap metal. Standard practices/procedures are in place for paper, cardboard and printer cartridges.

Exact figures for recycling cannot be provided as material is taken off site “co-mingled”.

Used 1000L pods are returned to the manufacturer for reconditioning and reuse.

**Table 8: Waste Management Register**

<b>Waste</b>	<b>Recycled Volumes*</b>
Oil	100,000 L
Scrap metal	1500 t
Grease	27 x 205L drums
Oil filters	15 pods
Oily rags	15 pod
Printer cartridges	4 bags
Empty oil drums	7 pods
E-waste	1 pod

\* One pod = 1000L

### ***Non-Mineral Waste Non-Recyclables***

#### ***Tyre Disposal***

No tyres were disposed in underground workings during the reporting period. All tyres for heavy mobile equipment have been used on the haul road bund wall for this period. All other LV and light truck tyres are removed from site under arrangement with the tyre supplier.

**Landfill**

The Broken Hill City Council on a weekly basis empties rubbish bins containing general site rubbish into a garbage truck. The rubbish is taken to the Broken Hill rubbish dump where it is deposited. There is no land fill on site.

**2.7 Water Management**

The primary use of water is for processing plant activity with some water losses occurring due to underground backfilling, water retained in the tailings, water in concentrate, water used for dust suppression and seepage at the TSF.

The closed water circuit for the mining operations results in complete management of process water with no off-site wastewater discharges directly from the operations other than the conventional sewage discharge. Collection ponds are in the vicinity of the processing activities to capture and return potentially mineralised sediment to the processing circuit.

The key aspects of the water management strategy include:

- The separation of raw water and potable water requirements. Raw water mining requirements include processing, workshop, vehicle wash-bay and dust suppression, while potable water requirements include showers, toilets and laundry.
- Reclaiming of water from the tailings storage facility to the processing plant.

Monitoring and updating of the water balance will be ongoing as mining operations progress. Observations regarding the rate of water usage and the effectiveness of the water balance on site will be reviewed periodically.

**Water Supply**

The water supply to the site comes from the Stephen's Creek Reservoir, Umberumberka Reservoir, Imperial Lake (emergency supply only) and Menindee Lakes Scheme on the Darling River. The following water supplies will be utilised over the life of the Project:

Broken Hill operations holds a license (85WA752823) which permits exemption from the water extraction embargo. There is no end date to this licence, the licence is valid indefinitely as long as operations exist.

**Clean Water**

The only clean water structures on site are the raw water tank and potable water tanks. There are no permanent watercourses within the mine's leases. All clean water runoff is diverted around the mine operations via bunding and drains as detailed on Plan 3, to ensure that clean water quality is not degraded with potential contaminants.

**Processing plant water management**

Runoff from the processing plant is directed to a 'first flush' plant water pond in catchment 42B, with overflows into a second pond (Plant Event Pond) located at the toe of the embankment within this catchment. Both ponds are lined facilities.



Blackwood Pit is used to retain the tailings from the processing plant. Supernatant water from this storage facility is transferred directly to a lined pond at the plant (Plant Water Pond) located in, but not part of, catchment 42B for subsequent reuse in the processing plant.

These ponds allow for the storage of supernatant water from Blackwood Pit, plant upsets and a 1:100 24 hour rainfall event. Any overflow from the Plant Event Pond (in excess of a 1:100 year rainfall event) is directed to Horwood Dam.

### Shaft Seven Water

The storage area S22 is a large gully with a storage capacity in excess of 40,000m<sup>3</sup>. The gully is used as catchment storage for runoff from surrounding catchments including TSF 1. It is also used for the separate storage and settling of water from the operating underground mine workings and the shaft7. This water is reused for mining activities underground.

The area of S22 is divided into 5 compartments with the northern and southern ends available for surface water runoff (Figure 3). For a 1:100 year rainfall event, runoff into the northern compartment of the gully will be from TSF 1 of approximately 10,304 m<sup>3</sup>. The runoff into the southern compartment of the gully will be from catchments 18, 19, 21A, 21B and 22 and will approximate to 10,185m<sup>3</sup>.

The central three compartments are lined and comprise of two settling ponds and a storage pond with installed pumping capacity.

The volume of stored water in northern and southern compartments is kept to a minimum. Any collected stormwater is either evaporated or added to the central compartments for reuse underground or in the processing plant.

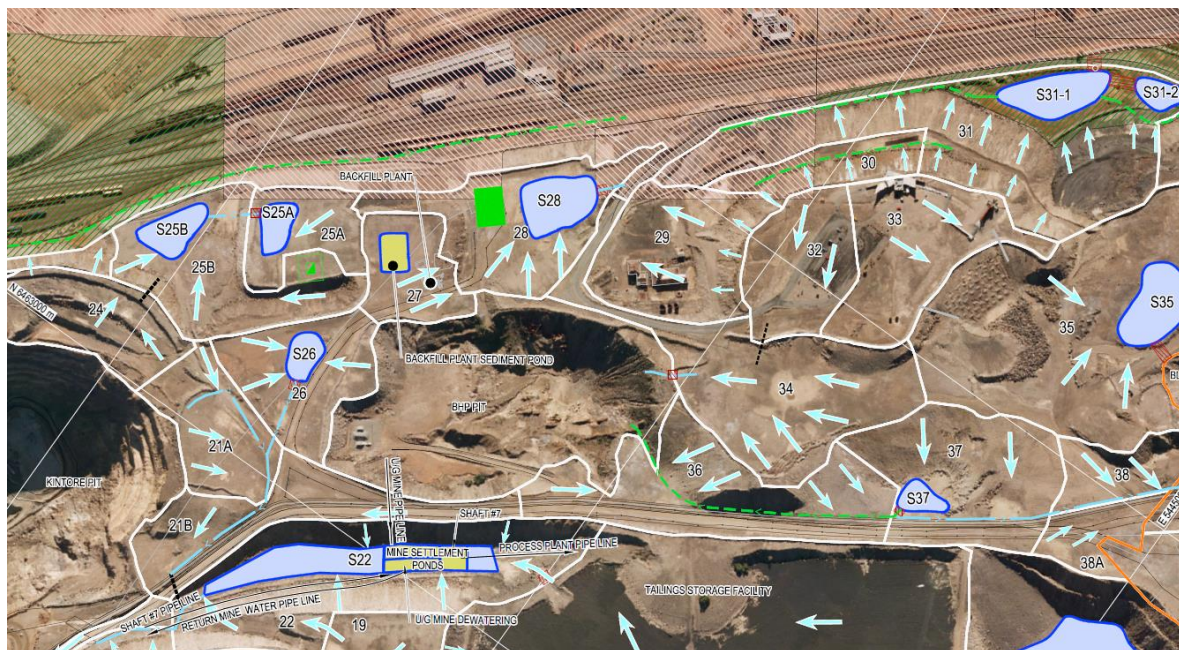


Figure 3: Storage Area S22

***Controlled Discharge***

There was no surface discharge of contaminated water during the reporting period.

***Water Containment Structures***

All surface runoff on site is captured by diversion trenches or berms and channelled to site water storage structures. Water catchments and containment structures are presented in Plan 3. Catchments, capacities and estimated stored water volumes for the reporting period are provided in Table 9. Detailed surveying of the water storage structures is planned for the next reporting period. Surveys will be used to develop staged storage curves that will enable more accurate capacities and volumes to be determined.

Markers have been placed in water ponds to indicate the maximum level to which water may be stored in the facilities to maintain sufficient free board to accommodate a 1:100y 72 hour storm event.



**Table 9: Water Containment Structures**

		Volumes held (cubic metres)		
	Pond Identification	Start of reporting period (1/4/14)	At end of reporting period (16/12/14)	Storage Capacity m <sup>3</sup>
<b><u>Clean Water</u></b>				
	Workshop	14	14	14
	Boom Gate	2	2	2
	Mill	9	9	9
	Delprat's Shaft	9	9	9
	Kintore Pit	18	18	18
	Silver Tank	8000	8000	8000
<b><u>Dirty Water</u></b>				
	S2	0	0	5003
	S14	0	0	7813
	S17	0	0	4265
	S31	0	0	225
	S49	0	0	1951
	S35	0	0	6092
<b><u>Controlled discharge</u></b>				
	N/A	N/A	N/A	N/A
<b><u>Contaminated water</u></b>				
	Horwood Dam	6000	6000	7663
	Plant Water Pond	2000	2000	2000
	S22 Mine Settlement Ponds	1000	1000	1000
	S22-A	2000	2000	2000
	Vehicle Wash	10	10	10

## 2.8 Hazardous Material Management

### *Licensing*

Rasp holds Licence XSTR100095 for the storage and handling of dangerous goods. The license is valid until February 2017. Rasp also holds a Radiation Management Licence 5063802 which is valid until 26/7/15.

***Dangerous Goods Management***

Site dangerous goods management is managed according to the site "Chemical Management and Storage Procedure" and the "Dangerous Goods / Hazardous Substance Spill or Leak Response Procedure."

A Safety Data Sheet (SDS) database for each chemical is maintained. SDS's are kept at each location where chemicals are stored and in the mines rescue room. SDS's are also electronically available on the mine intranet using the *ChemAlert* database program. All SDS's across site are continually updated.

General and contractor inductions outline the required actions in the event of a spill, including completing an Incident Report.

All quantities and map with locations are reference in the Pollution Incident Response Management Plan.

***Diesel storage***

Diesel is stored in two tanks each with a capacity of 68,000L. These self bunded transtanks are located east of the workshop and are sitting on a constructed concrete re-fuelling station. The facility has been designed and manufactured in accordance with AS1940 and AS1692. BHOP has provision for diesel storage on its Dangerous Goods Licence, UN 00C1 Diesel 150,000 L.

***Lubricants and oils***

Lubricants and oils are stored in individual pods located on a portable bund. A storage facility for these lubricants and oils has been constructed on the western side of the main workshop. It consists of a raised concrete pad incorporating drainage to a sump to facilitate cleaning.

***Processing Reagent Storage***

All reagents are stored in a purpose built storage facility designed to prevent contamination and capture spillage.

All quantities and map with locations are reference in the Pollution Incident Response Management Plan.

### **3. ENVIRONMENTAL MANAGEMENT AND PERFORMANCE**

#### **3.1 Meteorological**

A fully automated weather station has been installed on site. The data recorded by the site weather station has shown discrepancies with the Broken Hill Bureau of Meteorology station. Rasp has been in consultation with Envirodata and have been unsuccessful in repairing the weather station with any consistency or reliability. For this reason, BHOP is continuing to attain weather data from the Bureau of Meteorology. BHOP are rectifying the weather station through Pollution Reduction Program U4 as issued by the EPA.

### 3.2 Air Quality

Development Consent MP 07\_0018 specifies two classes of air quality impact assessment criteria relevant to mining operations. These classes relate to dust deposition and particulate concentration levels. Dust deposition levels refer to the quantity of dust particles that settle out from the air as measured in grams per square metre per month ( $\text{g/m}^2/\text{month}$ ) at a particular location. Particulate concentration refers to airborne dust and is measured in micrograms per cubic metre of air ( $\mu\text{g/m}^3$ ).

#### **Dust Controls**

Dust generation is minimised on site by using RST Total Ground Control chemical dust suppressant on free areas and sealing the haul road and other high use roads around the site. The sealed roads are maintained by using a contracted street sweeper and the sites water truck as required. Unsealed site roads are watered with a water truck as required.

Rasp manages dust emissions from free areas by restricting access to free areas and by maintaining chemical dust suppression on a six monthly schedule. When personnel are required to access free areas, an inspection of the area is conducted to ensure the integrity of the dust suppression.

#### **Long-Term Impact Assessment Criteria for Particulate Matter**

The criteria for particulate concentration are defined in terms of two particle size fractions: TSP and  $\text{PM}_{10}$ .

TSP relates to particles of all size able to remain suspended in the atmosphere; typically particulate matter with aerodynamic diameters of up to 30 micrometres ( $\mu\text{m}$ ).

$\text{PM}_{10}$  refers to particulate matter with an aerodynamic diameter less than  $10\mu\text{m}$ .  $\text{PM}_{10}$  is a sub-component of TSP.

The Development Consent MP 07\_0018 long term impact assessment criteria for particulate matter are summarised in Table 10.

**Table 10: Long Term Impact Assessment Criteria for Particulate Matter**

Pollutant	Averaging period	<sup>d</sup> Criterion
Total suspended particulate (TSP) matter	Annual	<sup>a</sup> $90 \mu\text{g/m}^3$
Particulate matter < $10 \mu\text{m}$ ( $\text{PM}_{10}$ )	Annual	<sup>a</sup> $30 \mu\text{g/m}^3$

#### **Short-Term Impact Assessment Criterion for Particulate Matter**

An Impact Assessment Criterion for maximum 24-hour average  $\text{PM}_{10}$  is specified within the Rasp Mine Development Consent (MP 07\_0018), as provided within Table 11.

**Table 11: Short Term Impact Assessment Criterion for Particulate Matter**

Pollutant	Averaging period	<sup>d</sup> Criterion
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	<sup>a</sup> 50 µg/m <sup>3</sup>

### Dust Deposition

The Development Consent MP 07\_0018 expresses dust deposition criteria in terms of both an acceptable increase in dust deposition over the existing background levels and an absolute maximum value. These impact assessment criteria are summarised in Table 12.

**Table 12: Dust Deposition Criteria**

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
<sup>c</sup> Deposited dust	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month	<sup>a</sup> 4 g/m <sup>2</sup> /month

### In-Stack Air Quality Criteria

The DECCW specify in-stack performance criteria within the Protection of Environment Operations (Clean Air) Regulation (2010). Standards of concentration specified in this document represent minimum requirements for point source emissions within NSW. They are generally expressed in terms of milligrams per cubic metre of air (µg/m<sup>3</sup>), expressed at reference conditions (typically Dry, 273 K, 101.3 kPa).

Condition 4 of Schedule 3 of Development Consent MP 07\_0018 states:

*The Proponent shall ensure that the project is operated in a manner that does not exceed the criteria listed in Tables 4 and 5.*

“Tables 4 to 5” referred to above are summarised in Table 13 and Table 14 below.

**Table 13: Discharge Criteria for Point 1 – Ventilation Shaft (Little Kintore Pit)**

Pollutant	Units of Measure	Concentration Limit
Oxides of nitrogen (as NO <sub>2</sub> )	Milligrams per cubic metre	350
Total solid particles (TSP)	Milligrams per cubic metre	20
<sup>a</sup> Type 1 and Type 2 substances	Milligrams per cubic metre	1
Volatile organic compounds (as n-propane)	Milligrams per cubic metre	40

**Table 14: Discharge Criteria for Point 2 – Process Enclosure / Baghouse Stack**

Pollutant	Units of Measure	Concentration Limit
Total solid particles (TSP)	Milligrams per cubic metre	<sup>b</sup> TBD
<sup>a</sup> Type 1 and Type 2 substances	Milligrams per cubic metre	<sup>b</sup> TBD

## Monitoring Data

### 3.2.1 Dust deposition

Total fallout dust (depositional dust) is sampled monthly. A total of seven depositional gauges are in use. Two gauges are located on site and five off site, one control site is located at Casuarina Avenue see Figure 4: Dust Deposition Gauges. Samples are sent to ALS Laboratory in Newcastle for NATA accredited analysis.

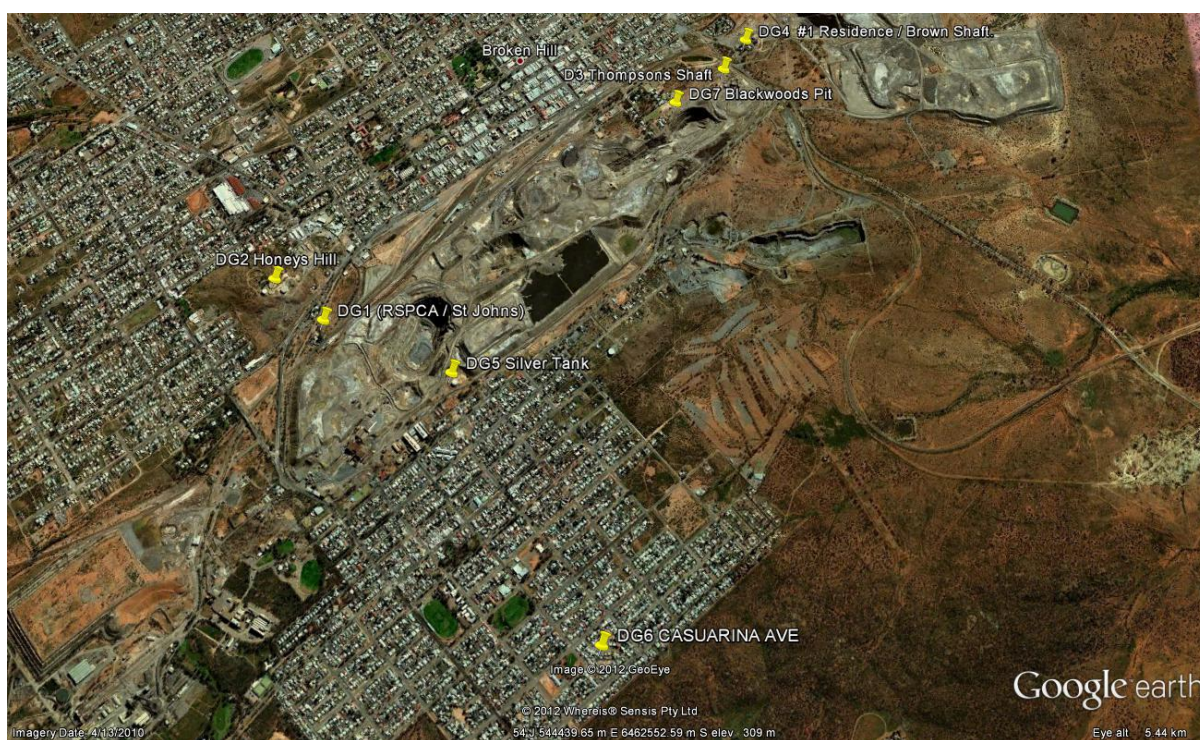


Figure 4: Dust Deposition Gauges

The limit for atmospheric dust deposition is set out in the project approval and is aligned with the recommended limits in *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW*. The guidance document recommends a maximum level of a 12 month average of 4 g/m<sup>2</sup>/mth for insoluble solids, and that the activities should not generate dust 2 g/m<sup>2</sup>/month above the background levels. A summary of the fallout dust results are given in Table 15.

**Table 15: Summary of Fallout Dust Analysis**

Site	Particulates – deposited matter (g/m <sup>2</sup> /m)					Total Lead (g/m <sup>2</sup> /m)		
	MIN	MAX	MEAN	BACKGROUND (from EA 2010)	DIFFERENCE	MIN	MAX	MEAN
<b>D1</b>	0.17	1.75	0.81	4.0	-3.19	0.00	0.00	0.00
<b>D2</b>	0.11	1.19	0.40	3.01	-2.61	0.00	0.00	0.00
<b>D3</b>	0.17	3.23	1.34	4.3	-2.96	0.00	0.01	0.01
<b>D4</b>	0.28	4.30	1.71	5.7	-3.99	0.00	0.01	0.00
<b>D5</b>	0.34	3.17	1.16	N/A	N/A	0.00	0.01	0.00
<b>D6</b>	0.23	13.01	3.26	5.8	-2.54	0.00	0.01	0.00
<b>D7</b>	0.11	1.98	0.77	N/A	N/A	0.00	0.01	0.00

**Dust Particulate Concentration High Volume Air Samplers****HVAS1 (EPL10)**

The average TSP level for the reporting period was 26.83 µg/m<sup>3</sup>. This is less than in the previous reporting period and indicates that dust control measures at this monitoring point are being maintained adequately. The 12 month lead average has remained low at 0.39 µg/m<sup>3</sup> Table 16.

There were five samples collected during the reporting period that differ significantly from the average PM10 lead result. As the results were an order of magnitude higher than the average, the soil in the surrounding area was tested to investigate the validity of the results. Testing indicated that the lead concentration in this area was 2%. As the results differ significantly and the surrounding lead concentration is low it is unlikely that the results are valid. BHOP is working together with Onsite Laboratories to verify the results attained.

**Table 16: TSP HVAS1 (EPL10) Results Overview**

PERIOD	TSP (µg/m <sup>3</sup> )			Total Lead (µg/m <sup>3</sup> )		
	MIN	MAX	MEAN	MIN	MAX	MEAN
1 <sup>st</sup> April 2014 – 16 December 2014	3.04	78.39	22.08	0.00	0.41	0.13

**HVAS2 (EPL 11)**

The average PM10 level at this monitoring point was 15.80 µg/m<sup>3</sup> Table 17. This result remains well below the criteria of 30ug/m<sup>3</sup>. There were two samples collected during the reporting period that differ significantly from the average PM10 lead result. As the results were an order of magnitude higher than the average, the soil in the surrounding area was tested to investigate the validity of the results. Testing indicated that the lead concentration

in this area was 2%. As the results differ significantly and the surrounding lead concentration is low it is unlikely that the results are valid.

**Table 17: PM10-HVAS2 (EPL11) Results Overview**

PERIOD	TSP ( $\mu\text{g}/\text{m}^3$ )			Total Lead ( $\mu\text{g}/\text{m}^3$ )		
	MIN	MAX	MEAN	MIN	MAX	MEAN
1 <sup>st</sup> April 2014 – 16 December 2014	0.06	25.89	6.88	0.01	0.18	0.06

### HVAS 3 (EPL12)

The average PM10 reading at this location was  $14.26 \mu\text{g}/\text{m}^3$  which was less than the previous reporting period Table 18. However results indicated that total lead content has increased ( $0.083 \mu\text{g}/\text{m}^3$  to  $0.42 \mu\text{g}/\text{m}^3$ ). A number of results vary significantly from the average content of lead per PM<sub>10</sub> dust sample. The average content of lead in a PM10 sample at this location is 3%. For example the result obtained on the 10<sup>th</sup> of February 2014 was 18% lead. The data has been checked with the lab and appears to be correct. Some split samples (blind duplicate or lab duplicate) may be required in the future to test lab methods are adequate.

**Table 18: PM10 HVAS3 (ELP12) Results Overview**

PERIOD	TSP ( $\mu\text{g}/\text{m}^3$ )			Total Lead ( $\mu\text{g}/\text{m}^3$ )		
	MIN	MAX	MEAN	MIN	MAX	MEAN
1 <sup>st</sup> April 2014 – 16 December 2014	0.06	75.18	9.30	0.01	0.33	0.07

### TEOM Monitors

The Rasp Mine has two TEOM monitors which record real time PM10 data. This data is used to manage dust emissions during the day. The monitors provide a real time read out on a kiosk computer in the HSE office which is monitored by HSE personnel. When the level exceeds  $50 \mu\text{g}/\text{m}^3$ , the cause is investigated and where possible controlled by use of the water truck or by modifying work methods. During the reporting period monthly averages did not exceed criteria at either monitoring point. Figure 5 shows the recorded data at each TEOM for the reporting period.

The annual rolling average for PM10 was not exceeded during the monitoring period.

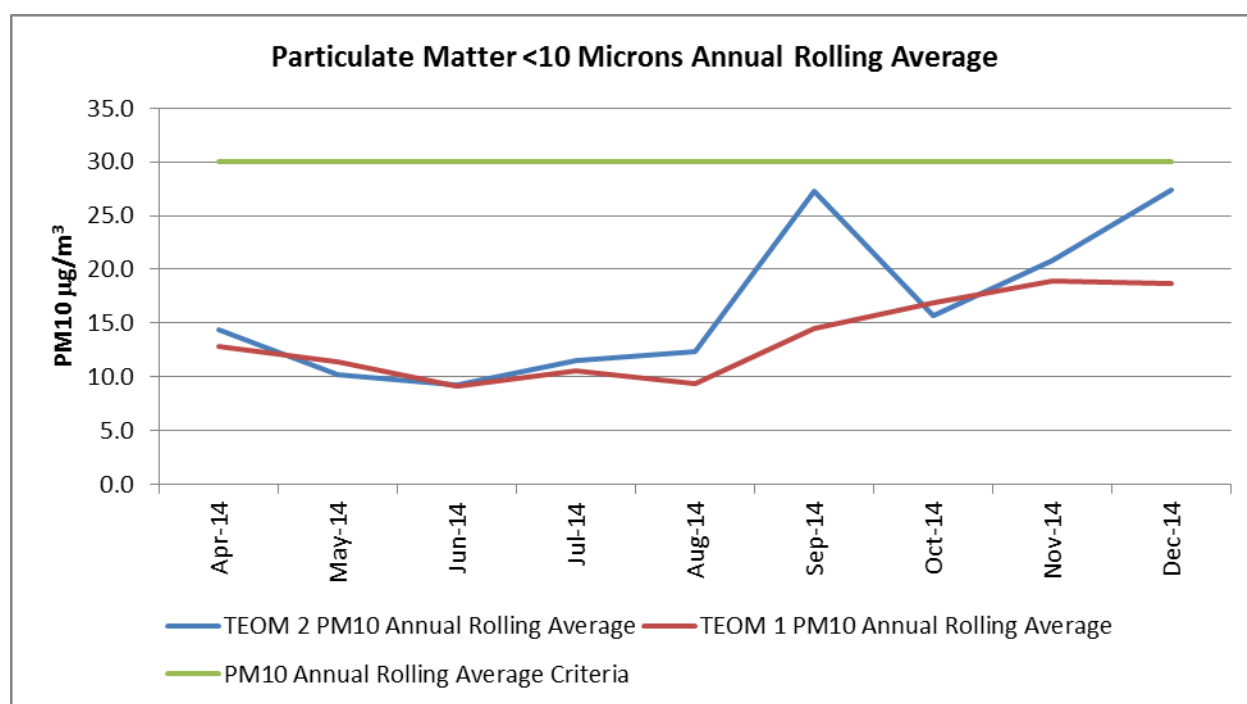


Figure 5: TEOM 1 and 2 Monthly Average PM10 levels

### In-Stack Air Quality

Pacific Environment was commissioned by CBH Resources to conduct air emissions sampling from two sources at their Broken Hill Operations. The sources sampled were the vent shaft emission point and the mill bag-filter release point.

The sampling on the vent shaft is timed to coincide with blasting activities in the mine. To perform representative sampling on a release point of this size and to achieve reasonable detection limits, the sampling time is calculated to 80 minutes and the sampling is started immediately following the start-up of the sprinklers just prior to the blast. As described in the Rasp Mine Air Quality Monitoring Program, stack testing is conducted quarterly at the ventilation shaft. Water sprays were installed in the vent rise and are used during blasts to maximise suppression of dust. Emission testing is also conducted at the bag house. Table 19 and Table 20 show the results of emission testing during the reporting period for the Vent Shaft and Mill Baghouse respectively.

Table 19: Emission Testing Results

Vent Shaft						
Element	Units	EPL Limits	11-Feb-14	07-Jul-14	22-Oct-14	02-Dec-14
Stack PM Concentration	mg/Nm3	20.00	4.20	6.616	8.111	3.255
Nitrogen Oxides (NOx as NO2)	mg/Nm3	350.00	36.54	2.61	2.05	5.23
Total Heavy Metals	µg/Nm3	1000.00	97.4	88.7	117	184
Volatile Organic Compounds	mg/Nm3	40.00	1.16	0.039	1.279	1.279



**Table 20: Emission Testing Results**

Mill Baghouse						
Element	Units	EPL Limits	12-Feb-14	08-Jul-14	22-Oct-14	02-Dec-14
Stack PM Concentration	mg/Nm <sup>3</sup>	20.00	4.99	3.799	7.55	5.85
Total Heavy Metals	µg/Nm <sup>3</sup>	1000.00	126	229	187	387

All results were within the monitoring criteria and no incidents were recorded.

### 3.3 Erosion and Sediment

The majority of the existing batters were constructed during former mining operations and consequently the surfaces of the batters consist predominantly of weathered rock. It is not practical to reshape the slopes, as most of the slopes are on the mining boundary, steep and predominantly comprise of large rock aggregate. The process of erosion over the years since the slopes were formed has removed most of the finer materials and the existing surface now comprises relatively large and coarse rock resulting in a self-armoured surface with limited erosion potential.

To limit further erosion of the batters, surface water is diverted by shaping the top area of the landform to allow surface water to drain away from the crest of the slopes. Where this is not possible, open drainage channels divert surface water away from the batter face.

Storage ponds effectively serve as sediment control ponds and limit the movement of sediment throughout and off site. Ponds are routinely inspected quarterly and after significant rain events. Inspections consist of a visual assessment for erosion, flooding, rubbish, algal growth or significant sediment build up.

Erosion and Sediment Control is managed through the Erosion and Sediment Control Procedure.

Monitoring during the reporting period did not identify any serious erosion issues. Due to the low rainfall over the reporting period, there was limited erosion observed.

### 3.4 Water Usage

Raw water and potable water are supplied by Essential Water with take off valves at the Eyre Street entrance. Raw water (288 ML/annum), water from the town supply, is supplied untreated to the project via existing connections.

Approximately 300 ML/annum of water is reclaimed onsite from various sources to be recycled for the Project, mainly from underground dewatering. If necessary, the reclaimed water will be treated onsite to ensure that it is suitable for use as process water in both the processing plant and underground operations. The sources for the reclaimed water include:

- No. 7 Shaft dewatering (95 ML);
- mine underground operations dewatering (135 ML);
- processing plant tailing and thickener overflows (included in TSF decant pond reclaim water);
- TSF decant pond (116 ML); and
- stormwater containment dams (amount dependent on extreme rain events as insufficient runoff is collected for pumping during normal rainfall events, therefore no allocation has been made).

Reclaimed water will be returned after treatment at the back fill plant to the process water tank which has a three hour holding capacity or to the Silver Tank which has a capacity of 9 ML.

### **Water Management**

The site water management plan encompasses responses to the relevant planning conditions as outlined in the project approval. The SWMP includes a ground water monitoring programme, sediment control plan, surface water monitoring and maintenance plan, a water balance and communication plan.

### **Raw Water Monitoring**

Raw water is used for firefighting and specific parts of mill processing. Hydrants are located adjacent to the office buildings on Eyre Street, the truck wash facility, workshop and Kintore Pit portal.

Raw water was required for dust control and general construction works where recycled water was not considered feasible (due to potential for cross contamination or unsuitability for the purpose of the intended use).

## **3.5 Potable Water**

Water from the town supply is treated at the Mica Street treatment plant and supplied to the Project via existing connections and is used for showers, toilets, and laundry. Average usage of potable water is 9 ML/annum. Potable water is supplied to the offices, workshop, core shed and processing facility.

## **3.6 Surface Water Monitoring**

There are no natural water courses or creeks flowing through the site. The drainage network layout restricts runoff leaving the active area of the site up to the 1 in 100 year event.

Surface water monitoring includes a weekly visual inspection of water storage facilities, freeboard and structural integrity. The tailings storage facility and the processing events dam are inspected and levels checked monthly. Quarterly water quality samples are taken from dams when the water levels are above 20% capacity.

Surface water analysis for the reporting period was compared to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 – livestock water quality*. Samples are couriered to ALS, a NATA accredited laboratory for analysis. The majority of the surface water storages do not comply with the guidelines and exceed thresholds for conductivity, pH, lead, zinc and sulphates. However, this is considered to be typical of surface waters in an operational metalliferous mine, and indicates that high metals are likely attributed to mineralisation of naturally sulphate rich or elevated lead and zinc occurrence in near surface soils (EES, 2013). All waters were contained within the containment structures with no off site discharges during the reporting period.

### Stormwater Ponds

Monitoring of water quality of the following stormwater ponds is carried out if the ponds contain water. The water quality results are used to compare with groundwater monitoring bores near the four ponds. The pond water quality of S1-A, S31-1, S31-2, S44, S49, S9B-1 and S9B-2 are measured at least twice a year when a pond has contained water for at least one week and the volume of stored water is at least 20% of the pond capacity. Water results from run off into ponds S31-1 and S31-2 are related to historic mining operations classified as heritage listed slag heaps.

Sample results are provided in Table 21, and indicate that stormwater has not been an issue throughout the reporting period due to a very dry season and lack of rain. All water was contained within the containment structures with no off site discharges during the reporting period.

**Table 21: Stormwater Pond Water Quality**

Sample	Date	Temp °C	pH	EC uS/cm	Sulphates mg/L	Lead mg/L	Zinc mg/L	Iron mg/L
	<b>Guideline</b>	<b>NA</b>	<b>6 – 9</b>	<b>7500</b>	<b>1000</b>	<b>0.1</b>	<b>20</b>	<b>NA</b>
S31-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S31-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S44	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S49	23/5/13	N/A	6.59	55	12	0.071	2.09	0.08
S9B-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S9B-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

### Horwood Dam

Monitoring of surface water in Horwood dam is conducted at least once a year after storm events and when the level of water is within 300 mm ( $\pm 20$ mm) from discharge occurring. No water was discharged from Horwoods Dam during the reporting period. Monitoring results from the reporting period are presented in Table 22.

**Table 22: Horwoods Dam Water Quality**

Sample	Date	Temp °C	pH	EC uS/cm	Sulphates mg/L	Lead mg/L	Zinc mg/L	Iron mg/L
	<b>Guideline</b>	<b>NA</b>	<b>6 – 9</b>	<b>7500</b>	<b>1000</b>	<b>0.1</b>	<b>20</b>	<b>NA</b>
Horwoods	11/2/14	N/A	6.88	17600	5820	0.021	309	0.00
Horwoods	21/10/14	N/A	6.32	14900	8000	1.20	1550	0.05

## 3.7 Ground Water

The regional groundwater near the site is depressed due to long term pumping from the underground mines in the area. This results in the depressed groundwater level below the site being more than 100m below the surface level, with a hydraulic gradient into the site at depth. The groundwater monitoring program is undertaken with the purpose of recording

perched groundwater movement. Perched groundwater refers to surface water that has infiltrated into the near surface moderate to high permeability material generally comprising of granular soils and rock dill. The perched ground water exists for short periods of time after rainfall events and generally seeps laterally over the low permeability bedrock surface below the near surface permeable material. The rainfall events at Rasp mine site indicate that the perched groundwater has the potential to surface seep rather than seep into the regional groundwater. Considering the depth of the regional groundwater it is concluded that there is little interaction between the shallow perched groundwater and the regional groundwater.

Rasp's ground water monitoring plan is outline in the Site Water Management Plan. The objective of the ground water monitoring program is to;

- Provide a program to monitor seepage movement within and adjacent to the tailings storage facility;
- Provide details of parameters and pollutants to be monitored and background local perched groundwater parameters;
- Establish a contingency measure in the event that an unacceptable impact is identified.

The existing monitoring bore holes provide an early warning sign if seepage is occurring near the CML7 lease boundry. Water from mine dewatering at Shaft 7 and from the mine decline will form part of the groundwater monitoring program. Samples of groundwater are collected every three months, water permitting.

The location and function of each borehole is listed in Table 23.

**Table 23: Location and function of Mine Dewatering Samples and Groundwater Monitoring Boreholes**

Groundwater Borehole ID/ Mine Dewatering	Location	Function / Purpose
GW01, GW02	South east of Mt Hebbard	To monitor if seepage is occurring from Mt Hebbard
GW03, GW04, GW05, GW06, GW07, GW08, GW09	East of TSF 1	To monitor potential seepage flows from TSF 1 towards the CML7 mine lease boundary
GW10	Downstream of Horwood Dam	To monitor potential seepage north of Eyre Street Dam.
GW11, GW12	Proposed east of Blackwood Pit	Proposed borehole to monitor potentially perched water as a result of potential groundwater mounding from TSF water
GW13, GW14, GW15	Adjacent to storage areas S44, S31-1 and S31-2	To monitor if movement of perched groundwater is occurring from the storages.
GW16	To the west of storage area S49.	To monitor potential seepage west of S49.
Shaft 7	Shaft 7	To assess groundwater quality of pumped water from Shaft 7
Mine Dewatering	Decline at Kintore Pit	To assess groundwater quality at decline

### ***Piezometers monitoring***

The piezometers are sampled quarterly when there is sufficient water quantity to enable sampling. Groundwater bores GW11-GW16 were installed to target seepage from TSF1 and monitor the surface water pond S49. There are a total of 16 monitoring bores across the CML7 and are presented in Figure 6.

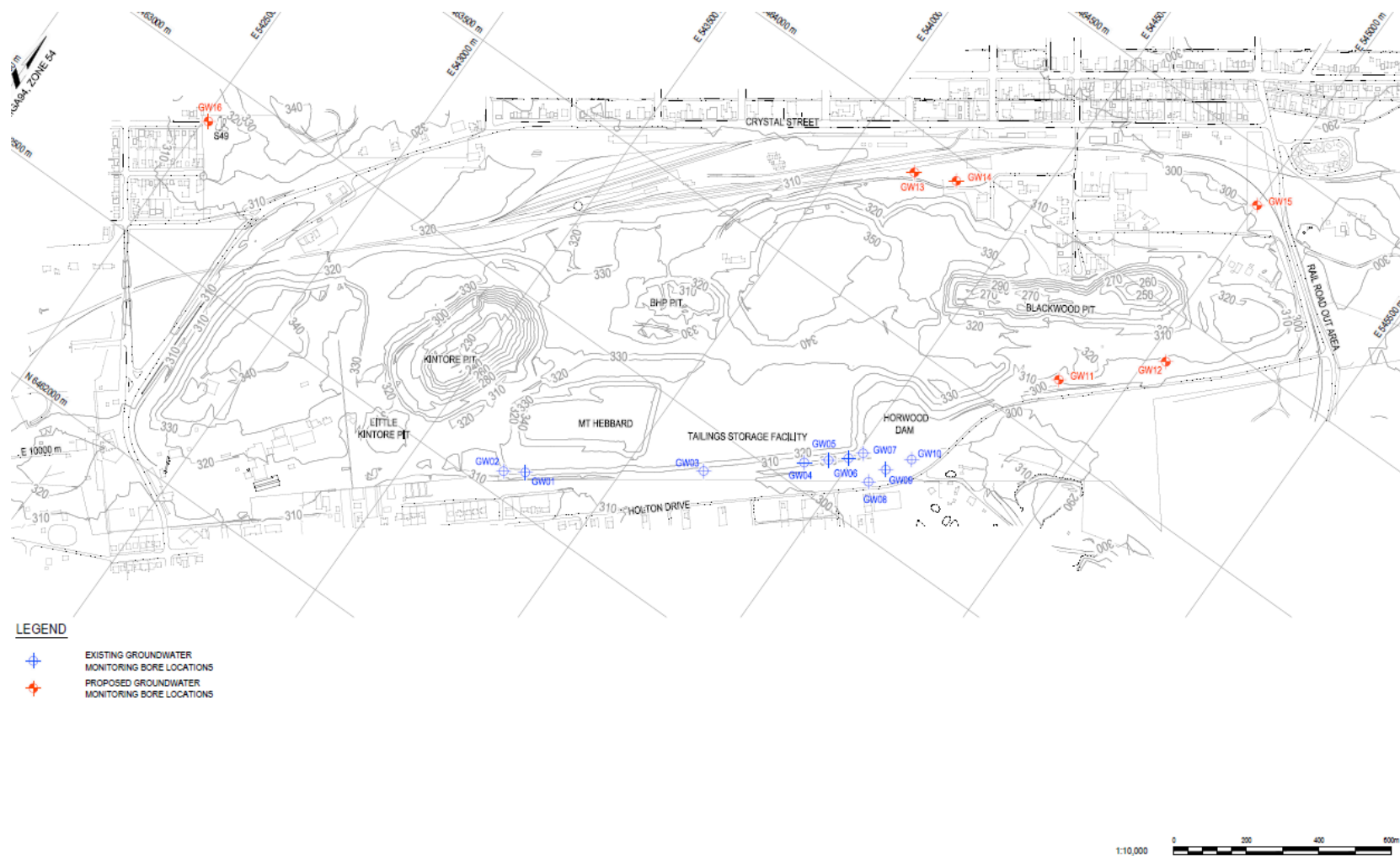


Figure 6: Monitoring Bore Locations

The majority of piezometers showed a steady or very slight decrease in levels during the reporting period. Levels in the piezometers can be attributed to low rainfall during the reporting period.

### **Water from Mine Dewatering**

Sampling of mine dewatering from shaft 7 and the mine decline forms part of the groundwater monitoring program. Sampling is carried out at the mine water pond in S22, where water from underground is discharged in to individual storage pond compartments. The central three compartments in S22 are lined for storage of underground water and to limit the risk of possible mixing of underground water with surface water runoff also being stored in S22. Samples taken at the central compartments in S22 are representative of the decline and shaft 7 samples. Sampling from mine dewatering is carried out every three months.

## **3.8 Contaminated Land**

The majority of the surface land area that makes up the Rasp Mine is historic mining waste material including waste rock emplacements and tailings.

The storage and handling of diesel fuels, lubricants and oils, and waste rock material are the only aspects of the operation which have the potential to contribute to contaminated land.

There were no spills or land contamination incidents recorded during the reporting period.

## **3.9 Hydrocarbon Management**

The main streams of hydrocarbons managed on site include:

- Fuel (diesel); storage and distribution
- Grease oils and lubricants; storage distribution and recovery for recycling
- Solvents used in the parts washer

### ***Fuel***

Diesel is stored in two tanks each with a capacity of 68,000L. These self bunded transtanks are located east of the workshop and are sitting on a constructed concrete re-fuelling station. The facility has been designed and manufactured in accordance with AS1940 and AS1692. BHOP has provision for diesel storage on its Dangerous Goods Licence, UN 00C1 Diesel 150,000 L. Surface distribution of diesel is by direct collection from the fuel browser. The tanks operate on a float and cut-off system that prevents overfilling of the tanks.

Rasp's fuel management system enables monitoring of fuel usage by each vehicle and piece of plant. This assists with maintenance and security as well as providing an accurate reporting mechanism for the collecting of data for NPI and NGERS reporting.

### ***Grease, oils and lubricants***

Lubricants and oils are stored in individual pods located on a portable bund. A storage facility for these lubricants and oils has been constructed on the western side of the main workshop. It consists of a raised concrete pad incorporating drainage to a sump to facilitate cleaning.

### **Solvents**

Oil solvent used for cleaning of mechanical parts at the workshop is removed by a contractor on a fixed maintenance schedule.

### **Processing Reagent Storage**

All reagents are stored in a purpose built storage facility designed to prevent contamination and capture spillage.

The reagents stored here include:

- Hydrated Lime
- Copper Sulphate
- Methyl isobutyl carbinol
- Sodium metabisulphite
- Sodium ethyl xanthate
- Sodium isopropyl xanthate
- Flocculant

All quantities and map with locations are reference in the Pollution Incident Response Management Plan.

## **3.10 Flora and Fauna**

The site is a highly disturbed environment that provides little value as native flora and fauna habitat. There have been no threatened flora, fauna or species habitat identified at the Rasp Mine.

## **3.11 Weeds**

Weeds are managed on an as needs basis with Trevor Hicks Pest Control engaged to spray any weed infestations. There have been no reported outbreaks during the reporting period.

## **3.12 Blasting**

Blast monitors are installed at three locations around site as per licence requirements. A roving blast monitor is also utilised for determining more information about ground conditions and vibration movement at various locations. When a blast complaint is received, the person is given the opportunity to have the roving monitor placed at their location. The aim of this is to assess community impact and also to gather information for future blast design.

As per Project Approval, blasting times are stipulated for production blasting and only occur between 6.45am and 7.15pm on any day. Development firing usually occurs at the end of every shift however under certain circumstances firings are completed during the shift.

On three occasions the overpressure reading exceeded the 120dB (Lin Peak) criteria. Investigations of the results indicated that the noise was the result of non-mining related activities. This receptor was located near a construction site which was active during the reporting period.

Airblast overpressure of 115 dB was exceeded less than 5% of the time for the total number of blasts over the reporting period. All other airblast criteria was met.

A total of 131 production blasts were fired at the Rasp mine site over the reporting period. There were a total of 6 blasts which exceed the 10 mm/s vibration limit.

A pollution reduction plan was developed with the EPA (Audit of Production Rock Blasting Activities Broken Hill Operations Pty Ltd ) Rasp Mine completed a full review of its blasting activities and the vibration results recorded. Nearly all recommendations have been implemented with some historical data to be entered for the practice of better blasting vibration prediction.

BHOP engaged Prism Mining to review blasting practices and vibration monitoring and in particular:

- Blast design;
- Estimated vibration readings;
- The set-up of the vibration monitors;
- Recorded data;
- Planning data for blast design; and
- Methodology for detonation to better control blast vibration.

BHOP has implemented a number of processes (as outlined in the PRP response) to manage blast vibration and reduce impact on the local community over the last 18 months.

These include:

- Developing a review process to help assist with future predictions;
- Making realistic predictions with regard to blast vibration that achieve the most likely minimum impact scenario;
- Moving away from aiming for an unattainable vibration peak that carries to much risk of an extraneous peak occurring;
- Predicting peak vibrations at three non-monitored locations to better determine the impact of our blasting on specific identified community locations;
- Where possible reducing the length of the blast to assist in limiting impact on the community; and
- Improving our database to isolate more information to a single source to better analyse result

It was identified that some of the initial design controls carried lower levels of predictability with regard to control of blasting vibration. For example blasts were initially designed for a longer duration with smaller impact blasting. However this was identified to have a greater risk of possible overlapping vibration frequency. This could possibly increase peaks at sources and increased the likelihood of sympathetic detonation occurring at a time not scheduled.

### **3.13 Operational Noise**

During the reporting period noise was generated by operation activities, movement of heavy vehicles and delivery trucks leaving and entering site.



## **Operational Noise Criteria and Control Measures**

The length and height of the existing earth bund along the southern haul road (from Kintore Pit to ROM pad) has been extended during the reporting period.

## **Operational Noise Monitoring**

Noise monitoring was taken quarterly at noise monitoring locations stipulated in the Development Approval. Noise readings were also completed on a 'as need' basis when a community complaint was received. Seven noise complaints were received in the reporting period

## **24 Hour Crushing Approval**

BHOP commenced 24hr crusher operation trials in November 2013. EMM was engaged to complete noise surveys and submit a modification to the environmental agreement.

### **3.14 Visual, Stray Light**

All light towers around machinery have been designed to face light away from residents. There were no light complaints for the reporting period.

### **3.15 Indigenous Heritage**

There are no known significant indigenous sites within CML7.

### **3.16 Natural and Social Heritage**

Rasp has engaged Austral Archaeology Pty Ltd to prepare a Conservation Management Plan (This work is ongoing). This is to allow for sufficient consultation to occur. Discussions have occurred with DoPI and Rasp has sought an extension to the completion of this work.

### **3.17 Spontaneous Combustion**

Products with high sulphur content (tailings, ore and concentrate) are prone to spontaneous combustion. Combustion is caused by the oxidation of the sulphides, which is an exothermic chemical reaction that causes heat build-up, and the remaining sulphides to start smouldering. In extreme cases the sulphides may burn producing a flame. Requirements for combustion to occur are high sulphur material, oxygen, moisture and sufficient material to generate heat build up. No incidences occurred during the period.

### **3.18 Bushfire**

#### ***Restriction of Fires on Site***

No incidences occurred during the period

#### ***Fire Control***

Hydrants supplied with town water are located on site have fireboxes with hoses located nearby. Rasp has a fully equipped fire truck available at all times to respond to fires. Rasp also has a trained mines rescue team for the purpose of fire fighting.

### 3.19 Mine Subsidence

#### *Subsidence Monitoring*

No incidences occurred during the period.

### 3.20 Methane Drainage/Ventilation

Methane is routinely monitored for underground workings and during underground drilling. No methane ventilation issues occurred during the reporting period.

### 3.21 Public Safety

The mine site is clearly signposted and fenced to restrict any unauthorised access. The majority of the BHOP surface area of CML7 is fenced and secured by locked gates or is bunded to discourage access. Therefore, the only significant public safety exposures will be if there is illegal or unauthorised public access to the CML7.

The control plan for such exposures are:

- Public access to the lease will be strictly controlled via security gates.
- All visitors accessing the site will be required to report to the administration office prior to entering and after exiting the lease.
- All visitors to the lease will undergo a visitor's induction before entering the lease and will be accompanied by a fully inducted employee or contractor at all times.
- All contractors will have to undergo the appropriate induction prior to commencing any work on site.
- Regular inspections are undertaken of the lease boundary to check that the site fences are fit for purpose and that site access gates are secure.

Visitors to the mine are only allowed on site with management approval and are required to undertake a visitor briefing (induction), and are accompanied by a site representative at all times. Visitor briefing cards are distributed to ensure key information is readily at hand for visitors. Visitors must follow site policies and conform to personal protective equipment (PPE) requirements.

All employees and contractors complete a general induction and work area specific inductions where required (e.g. underground, mill).

### 3.22 Radiation

During the reporting period, Endeavor's Radiation Licence to Sell/Possess no. RL28863 was converted to a new Radiation Management Licence no. RML28863. The renewal period on this licence is two years. The environmental officer monitors all renewal dates via the central compliance register. An external contractor conducts six monthly inspections of the individual radiation gauges on site.

### 3.23 Environmental Incident Management

All health, safety and environmental incidents are reported via the Rasp Incident Management Procedure. A summary of the incidents for the reporting period are shown in

Table 24. Rasp maintains a Pollution Incident Response Management Plan on the CBH Resources website in accordance with EPA requirements.

A total of environmental incidents were registered during the reporting period. The majority of incidents related to the management of hydrocarbons, or leaks and spills on site. As a result of Endeavor's good reporting culture, these types of incidents are promptly reported and can be addressed quickly. There were no reportable EPA incidents during the reporting period. The majority of incidents related to minor spillages.

**Table 24: Environmental Related Incidence for Reporting Period**

Date	Event Subtype	Description	Actions	Close Out
11-Nov-14	Spill	Lime plant spill	Hosed down Lime plant , pumped slurry back to plant	31-Mar-15
19-Oct-14	Spill	Clearing blocked dust system, dust spill	Hosed spill into bund area	26-Nov-14
9-Oct-14	Spill	Diesel spill at trans tank	Contaminated soil was removed and replaced	31-Mar-15
5-Oct-14	Spill	Tailings spill on hardstand outside bund	Volume was approx.. 50 litres picked up with spill kit	31-Mar-15
1-Oct-14	Noise & Vibration	Blast monitor ran out of battery life and failed to capture blast event	Battery replaced	3-Oct-14
2-Aug-14	Spill	Diesel spill	Small spill picked up with spill kit	27-Oct-14
22-Jul-14	Spill	Zn feed spilled outside of containment area	Removed affected soil to tails dam	1-Aug-14
15-Jul-14	Noise & Vibration	Environmental data was not uploaded to the web	Data reviewed and uploaded	1-Oct-14
5-Jul-14	Spill	Grey water leak	Plumber unblocked pipes	1-Aug-14
30-Jun-14	Spill	Lime slurry spill over bunded area	Removed affected soil to tails dam	1-Aug-14
28-Apr-14	Spill	Lime slurry spill over bunded area	Removed affected soil to tails dam	23-Jul-14
8-Apr-14	Spill	Lime slurry spill over bunded area	Removed affected soil to tails dam	23-Jul-14

## 4. COMMUNITY RELATIONS

### 4.1 Environmental Complaints

During the period of the AEMR BHOP has maintained a register for community complaints and concerns. A total of 47 complaints were received over the reporting period with 38 of these related to blasting vibration. BHOP has made significant steps to improve blasting over the reporting period. All complainants were followed up, contacted and closed out.

## 5. REHABILITATION

### 5.1 Buildings

There were no buildings erected or demolished during the year.

### 5.2 Rehabilitation and Disturbed Land

Table 25 and Table 26 detail disturbed areas. No new areas were disturbed during the reporting period.

**Table 25: Rehabilitation Summary**

	Area Affected / Rehabilitated (hectares)		
	To date 1/4/2014- 16/12/2014	Last Report 31/3/2013- 1/4/2014	Next Report 16/4/2014- 31/10/2015
<b>A: MINE LEASE AREA</b>			
<b>A1 Mine lease(s) Area</b>	226.4	226.4	226.4
<b>B: DISTURBED AREAS</b>			
<b>B1 Infrastructure area</b> (other disturbed areas to be rehabilitated at closure including facilities, roads)	64.5	64.5	64.5
<b>B2 Active Mining Area</b> (excluding items B3 – B5 below)	11.5	11.5	11.5
<b>B3 Waste emplacements,</b> (active / unshaped / in or out-of-pit)	2.5	1.70	2.5
<b>B4 Tailings emplacements</b> (active / unshaped / uncapped)	3.8	3.8	3.8
<b>B5 Shaped waste emplacement</b> (awaits final vegetation)	0.0	0.0	0.0
<b>ALL DISTURBED AREAS</b>	77.2	77.2	
<b>C REHABILITATION</b>			
<b>C1 Total Rehabilitated area</b> (except for maintenance)	149.1	149.1	149.1
<b>D REHABILITATION ON SLOPES</b>			
<b>D1 10 to 18 degrees</b>	4.1	4.1	4.1
<b>D2 Greater than 18 degrees</b>	14.7	14.7	14.7
<b>E SURFACE OF REHABILITATED LAND</b>			
<b>E1 Pasture and grasses</b>	N/A	N/A	N/A
<b>E2 Native forest / ecosystems</b>			

	Area Affected / Rehabilitated (hectares)		
	To date 1/4/2014- 16/12/2014	Last Report 31/3/2013- 1/4/2014	Next Report 16/4/2014- 31/10/2015
<b>E3 Plantations and crops</b>	2.6	2.6	2.6
<b>E4 Other</b> (include non-vegetative outcomes)	151.3	151.3	151.3

**Table 26: Maintenance Activities on Rehabilitated Land**

NATURE OF TREATMENT	Area Treated (ha)		Comment / control strategies / treatment detail
	Report Period	Next Period	
<b>Additional erosion control works</b> (drains re-contouring, rock protection)	0	0	N/A
<b>Re-covering</b> (detail further topsoil, subsoil, sealing etc)	0	0	N/A
<b>Soil treatment</b> (detail – fertiliser, lime, gypsum etc)	0	0	N/A
<b>Treatment / Management</b> (detail – grazing, cropping, slashing etc)	0	0	N/A
<b>Re-seeding / Replanting</b> (detail – species density, season etc)	0	0	N/A
<b>Adversely Affected by Weeds</b> (detail – type and treatment)	0	0	N/A
<b>Feral animal control</b> (detail – additional fencing, trapping, baiting etc)	0	0	N/A

## 6. ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

At the time of writing the following activities were proposed for the 2014/2015 reporting period (Table 27).

**Table 27: Works Schedule**

Activity	Proposed Completion Date	Status
Mine Closure Plan	June 2015	Underway
Conservation Management Strategy	May 2015	Underway