



## Application for Licence Amendment

### Part V Division 3 of the *Environmental Protection Act 1986*

---

**Licence Number** L7815/2001/11

**Licence Holder** Northern Star (Thunderbox) Pty Ltd

**ACN** 107 154 727

**File Number** 2012/006911-1

**Premises** Thunderbox Mining Operations

Legal description –

Mining tenements L36/155, L36/157, L36/158, L36/181, L36/193, L36/199, L36/202, L37/61, L37/73, L37/142, L37/166, L37/181, L37/199, L37/215, L37/216, M36/35, M36/177, M36/421, M36/428, M36/462, M36/473, M36/494, M36/503, M36/504, M36/512, M36/525, M36/527, M36/541, M36/542, M36/582, M37/339, M37/340, M37/356, M37/357, M37/358, M37/359, M37/360, M37/361, M37/465, M37/367, M37/368, M37/437 and M36/599

As defined by the Premises maps attached to the Revised Licence

**Date of Report** 29 April 2024

**Decision** Revised licence granted

## Table of Contents

<b>1. Decision summary</b>	<b>1</b>
<b>2. Scope of assessment</b>	<b>1</b>
2.1 Regulatory framework	1
2.1 Overview of premises	1
2.2 Application summary	1
2.2.1 Expanded Mill	2
2.2.2 Power station upgrades	2
2.3 Department initiated amendments	3
<b>3. Risk assessment</b>	<b>3</b>
3.1 Source-pathways and receptors	3
4.1.1 Emissions and controls	3
4.1.2 Receptors	5
3.2 Risk ratings	7
<b>4. Consultation</b>	<b>10</b>
<b>5. Conclusion</b>	<b>10</b>
5.1 Summary of amendments	10
<b>References</b>	<b>13</b>
Table 1: Proposed throughput capacity changes	2
Table 2: Proposed controls	3
Table 3: Sensitive human and environmental receptors and distance from prescribed activity	5
Table 4. Risk assessment of potential emissions and discharges during operation of the premises	8
Table 5: Consultation	10
Table 6: Consolidation of licence conditions in this amendment	10

## 1. Decision summary

Licence L7815/2001/1 (the Existing Licence) is held by Northern Star (Thunderbox) Pty Ltd (the 'Licence Holder') for the North Eastern Goldfields Operations (the Premises), located within several mining tenements<sup>1</sup> in Leinster, Western Australia.

This Amendment Report documents the assessment of potential risks to the environment from proposed changes to the emissions and discharges during the operation of the Premises. As a result of this assessment, Amended Licence L7815/2001/1 has been granted.

This Amended Licence consolidates and supersedes the existing Licence previously granted in relation to the Premises. The Amended Licence has been granted in a new format with existing conditions being transferred, but not reassessed, to the new format.

## 2. Scope of assessment

### 2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

### 2.1 Overview of premises

The premises covers an open pit and underground gold mine. The licence holder acquired the Thunderbox Operations in February 2021 through a Merger of Equals with Saracen Mineral Holdings. The Thunderbox mine life is expected to run until around 2031. The premises boundary extends from the Otto Bore project (10 km north of the Thunderbox mill) to the Bannockburn project 40 km south and encompasses several satellite mining areas.

Ore processing occurs at the Thunderbox mill via a carbon-in-leach processing circuit. Tailings are discharged to tailings storage facility (TSF) cells A and B, which are located approximately 2.5 km to the east of the mill. Other significant infrastructure within the premises boundary includes the power station, paste plant, accommodation village, wastewater treatment plant, landfill and other associated mine infrastructure.

The disposal of tailings generated by the expanded Thunderbox Mill will be supported by the construction of two additional TSF cells to meet the life of mine requirements. The works approval for the construction of these new cells (Cell C and D) was granted on 2 July 2021.

### 2.2 Application summary

On 6 April 2023, the Licence Holder submitted an application to the department to amend Licence L7815/2001/11 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Authorise the operation of the following infrastructure constructed under Works Approval W6532/2021/1:
  - Expanded Thunderbox Mill infrastructure, including improved stormwater drainage;

---

<sup>1</sup> L36/155, L36/157, L36/158, L36/181, L36/193, L36/199, L36/202, L37/61, L37/73, L37/142, L37/166, L37/181, L37/199, L37/215, L37/216, M36/35, M36/177, M36/421, M36/428, M36/462, M36/473, M36/494, M36/503, M36/504, M36/512, M36/525, M36/527, M36/541, M36/542, M36/582, M37/339, M37/340, M37/356, M37/357, M37/358, M37/359, M37/360, M37/361, M37/465, M37/367, M37/368, M37/437 and M36/599

and

- Power station infrastructure upgrades.

A construction Compliance Report and Environmental Commissioning Report and additional supporting information was provided to the department by 31 August 2023. The provided information was sufficient to demonstrate compliance with conditions 2, 3 and 10 of works approval W6532/2021/1. A Time Limited Operations Report was provided on 21 February 2024, which adequately address the requirements of Works Approval W6532/2021/1.

This amendment is limited to changes to Category 5 and 52 activities listed on the Existing Licence. No changes to infrastructure or operations are proposed in relation to Categories 6, 54, 64 and 73. Table 1 below outlines the proposed changes to the Existing Licence.

**Table 1: Proposed throughput capacity changes**

Category	Current throughput capacity	Proposed throughput capacity	Description of proposed amendment
5	3,000,000 tonnes per annual period	7,000,000 tonnes per annual period	Installation of expanded mill infrastructure including new crushing circuit
52	14.8 MW in aggregate.	38 MW in aggregate.	Installation of seven 2.5 MW gas powered generators

### 2.2.1 Expanded Mill

The expansion of the current mill within mining tenement M36/542 at the Premises allows for the increased nominal throughput from 3 million tonnes per annum to 7 million tonnes per annum. The expansion requires the construction or installation of the following:

- New primary jaw crushing circuit operating in parallel with the existing crushing circuit
- New crushed ore stockpile, accepting crushed products from the existing and new crushing circuits
- New 18 MW SAG mill
- New pebble crushing circuit
- New cyclone cluster
- New gravity circuit
- Two new 4,100 m<sup>3</sup> leach tanks
- Conversion of the existing pressure Zadra elution circuit to split-AARL
- New electrowinning cells to suit the new elution circuit
- New (parallel) tailings thickener
- Services upgrades as required.

### 2.2.2 Power station upgrades

The upgrades to the power station comprise the addition of seven 2.5 MW liquefied petroleum gas (LPG) powered generators within the footprint of the current powerhouse which is located within mining tenement M36/542 at the Premises. During time limited operations under works approval the works approval holder was able to demonstrate all generators were compliant against manufacturer technical specifications for stack emissions.

## 2.3 Department initiated amendments

As stated in Section 2.1 of this Amendment Report, the disposal of tailings in TSF Cells A and B generated by the expanded Thunderbox Mill will be supported by the construction of two additional TSF cells to meet the life of mine requirements. These new cells (Cell C and D) have been constructed under Works Approval W6601/2021/1. The licence holder has confirmed that groundwater monitoring bores MB4, MB5, MB6, MB7S, MB7D, MB8S and MB8D were decommissioned during construction works for TSF Cells C and D. However, new groundwater monitoring bores TSF-CD-01, TSF-CD-02, TSF-CD-03 and TSF-CD-04 located downgradient of TSF Cells A, B, C and D were constructed and are monitored in accordance with conditions set in Works Approval W6601/2021/1. As groundwater monitoring bores MB4, MB5, MB6, MB7S, MB7D, MB8S and MB8D no longer exist, reference to these groundwater monitoring bores have been removed from the licence. The Licence Holder will continue to monitor groundwater using new groundwater monitoring bores TSF-CD-01, TSF-CD-02, TSF-CD-03 and TSF-CD-04 under Works Approval W6601/2021/1 and will apply to transition these bores to the licence under a future amendment application.

In addition, it is understood that the Bannockburn TSF (Cells 1, 2 and 3) has been decommissioned and was fully rehabilitated by 2010. Further, the Licence Holder does not intend to recommence tailings deposition into the decommissioned TSF. As the TSF has been decommissioned, the department has removed reference to the Bannockburn TSF in the licence.

## 3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk assessments* (DWER 2020).

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

### 3.1 Source-pathways and receptors

#### 4.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this Amendment Report are detailed in

Table 2 below.

Table 2 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

**Table 2: Proposed controls**

Emission	Sources	Potential pathways	Proposed controls
<b>Operation (Category 5 - Processing Mill)</b>			
Dust	Screening, crushing, unloading, loading and storage of material.	Air/windborne pathway	Existing controls set in works approval W6532/2021/1: <ul style="list-style-type: none"> <li>New crushed ore stockpile will have a stockpile cover to mitigate fugitive dust.</li> <li>Water carts will be used to wet down</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<p>roads etc. when required.</p> <ul style="list-style-type: none"> <li>• All transfer points will be equipped with rubber sealing and skirting to contain dust.</li> <li>• Water sprays will be installed on the ROM bin</li> <li>• Dust extraction units (bag house) will be installed on the secondary crusher discharge and screen discharge chute.</li> </ul>
Chemicals or hydrocarbon	Chemical storage or fuel tank spills/leaks	Direct discharge to land	<ul style="list-style-type: none"> <li>• All hydrocarbons will be adequately bunded to ensure any spills or leaks are contained. The design and construction of storage facilities will be to Australian standards.</li> <li>• Spill kits will be located in hydrocarbon storage areas.</li> <li>• In the event of a spill, contaminated soil will be collected and removed to the bioremediation area for treatment.</li> <li>• All motors, pumps, crushers, drives and screens will sit on concrete footings which provide primary bunding for spills of oil and grease used to lubricate and maintain equipment. Additional leach tanks will be contained within primary concrete bunding which will be expanded to accommodate the additional infrastructure.</li> <li>• Contaminated stormwater runoff will be captured via existing stormwater infrastructure</li> </ul>
Sediment-laden stormwater	Stockpiles of crushed material	Overland runoff	<ul style="list-style-type: none"> <li>• The new infrastructure will be located in the processing plant area which has existing secondary bunding which drains to the south allowing surface water run-off to be capture in existing sumps or the ROM toe drain</li> <li>• Toe drain to be constructed around perimeters of new stockpile/reclaim area to capture sediment laden stormwater.</li> <li>• A new diversion drain will be constructed to the west of the precinct to stop water from reporting to the mill area. This diversion will direct water south where it will connect with existing drainage channels.</li> </ul>
Air emissions	Electrical generators within	Air/windborne pathway	<ul style="list-style-type: none"> <li>• Emissions from the powerhouse will be monitored and reported annually</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
	the powerhouse		as per operating Licence conditions.
<b>Operation (Category 52 – Power station generators)</b>			
Increased air emissions from power station and carbon regeneration kiln	Increase in aggregate power generation to 38 MW	Air/windborne pathway	<ul style="list-style-type: none"> <li>Emissions from the powerhouse and carbon regeneration kiln will be monitored and reported annually as per operating Licence conditions.</li> </ul>
Chemicals or hydrocarbon	Additional chemical storage or fuel tank spills/leaks	Direct discharge to land.	<ul style="list-style-type: none"> <li>The powerhouse shed is fully enclosed and concrete bunded and all drainage will report to an oil water separator for treatment. Treated water will be discharged into a concrete bund and allowed to evaporate. Should the volume of water that reports to the bund increase, to a point where it does not readily evaporate water will be transferred to the wash bay sump where it can be incorporated into the mill circuit</li> <li>All hydrocarbons will be adequately bunded to ensure any spills or leaks are contained. The design and construction of storage facilities will be to Australian standards.</li> <li>Spill kits will be located in hydrocarbon storage areas.</li> <li>In the event of a spill, contaminated soil will be collected and removed to the bioremediation area for treatment.</li> <li>Contaminated stormwater runoff will be captured via existing stormwater</li> </ul>

#### 4.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder’s from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Table 3 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental siting* (DWER 2020)).

**Table 3: Sensitive human and environmental receptors and distance from prescribed activity**

Human receptors	Distance from prescribed activity
Weebo Pastoral Station	20km northwest from the premises. <i>Screened out of risk assessment due to separation distance.</i>

Environmental receptors	Distance from prescribed activity
<p><i>Rights in Water and Irrigation Act 1914</i></p> <p>Goldfields Proclaimed Groundwater Area</p>	<p>Groundwater level: ranges from around 15 – 30 meters below ground level (mbgl).</p> <p>Groundwater quality: Total dissolved solids 370 – 740 mg/L and pH neutral to slightly alkaline 7.1 – 8.0.</p>
Surface water	<p>Several minor surface water drainage lines across the premises. Drainage line directly west of the Mill and Power station area.</p>
Native vegetation	<p>Native vegetation located adjacent to the western boundary of Thunderbox mill operations area.</p> <p>Priority flora (P4) <i>Calytix Uncinata</i> located within 1 km of the mill area.</p>



## 3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for those emission sources which are proposed to change and considers potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the Licence Holder has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4.

The Revised Licence L7815/2001/11 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises.

The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

**Table 4. Risk assessment of potential emissions and discharges during operation of the premises**

Risk Event					Risk rating <sup>1</sup>	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood			
Operation of the expanded Mill infrastructure, including new crushing circuit, crushed ore stockpiles, leach tanks.	Dust	<b>Pathway:</b> air / windborne pathway <b>Impact:</b> smothering of nearby vegetation causing adverse health effects or death	Nearby vegetation	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 2 – Infrastructure requirements	Not applicable. The Delegated Officer considers the existing dust controls set in the works approval to be sufficient to mitigate the risk to an acceptable level and has specified those controls in the amended licence.
	Hydrocarbon or chemical spills and leaks				C = Moderate L = Unlikely <b>Medium Risk</b>	Y	Condition 9	Not applicable.
	Sediment laden or contaminated stormwater	<b>Pathway:</b> overland run off <b>Impact:</b> contamination to water quality and soil / vegetation	Nearby vegetation Surface water lines		C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 2 – Infrastructure requirements	Not applicable. The Delegated Officer considers the existing controls set in the works approval to be sufficient to mitigate the risk to an acceptable level and has specified those controls in the amended licence. A key control is the toe drain installed around the perimeter of the stockpile/reclaim area to capture sediment-laden stormwater.
Operation of seven new 2.5 MW gas-powered	Hydrocarbon spills from generators	<b>Pathway:</b> overland run off <b>Impact:</b>			C = Slight L = Unlikely	Y	Condition 9	N/A

Risk Event					Risk rating <sup>1</sup>	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls	C = consequence L = likelihood			
generators at power station and from the carbon regeneration kiln stack		contamination to water quality and soil / vegetation			<b>Low Risk</b>			
	Increased air emissions from power station and carbon generation kiln stack	<b>Pathway:</b> air / windborne pathway <b>Impact:</b> respiratory discomfort	Human workers and closest resident		C = Minor L = Unlikely <b>Medium Risk</b>	Y	Condition 2 and 14	Not applicable. The Delegated Officer considers the existing air emission controls set in the works approval to be sufficient to mitigate the risk to an acceptable level and has specified those controls in the amended licence.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk assessments* (DWER 2020).

Note 2: Proposed Licence Holder's controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

## 4. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

**Table 5: Consultation**

Consultation method	Comments received	Department response
Shire of Leonora advised of proposal on 19 January 2024	None	N/A
Licence Holder was provided with draft amendment on 8 March 2024	Comments were received on 5 April 2024. The licence holder clarified some outstanding information however no comments were provided relating to the draft condition set or decision report.	N/A

## 5. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

### 5.1 Summary of amendments

Table 6 provides a summary of incorporating the proposed amendments to the licence, the changes made in transferring licence into the contemporary licence format, includes the removal or consolidation of redundant conditions. This will act as a record of implemented changes.

**Table 6: Consolidation of licence conditions in this amendment**

Existing condition	Condition summary	Revised licence condition	Conversion notes
N/A	Prescribed Premises Category table	N/A	Revised to current licensing format. Inclusion of increased throughput and electrical generation as per WA6532/2021/1.
1.1.1 1.1.2	Interpretation and definitions	N/A Interpretation section, Definitions and Table 1	Redundant condition. Revised to current licensing format.
1.1.3	Australian or other standard	N/A Interpretation section, Definitions and Table 1	Redundant condition. Revised to current licensing format.
1.1.4	Reference to code of practice	N/A Interpretation section, Definitions and Table 1	Redundant condition. Revised to current licensing format.
1.2.1	Recovery and removal of spills	Condition 9	Revised wording to include spills <u>inside</u> engineered containment system.

Existing condition	Condition summary	Revised licence condition	Conversion notes
1.3.1	Use of pipelines	Condition 7	New numbering
1.3.2, 1.3.3, 1.3.4 and Table 1.3.1	Containment infrastructure	Condition 1 and Table 1	New numbering and removal of reference to decommissioned TSFs 1, 2 and 3 (Bannockburn)  The licence holder confirmed that the Bannockburn TSF (Cells 1, 2 & 3) has been decommissioned and fully rehabilitated.
1.3.5 and Table 1.3.2	Inspection of infrastructure	Condition 6 and Table 3	New numbering
1.3.6	Water balance	Condition 8	New numbering
1.3.7 and Table 1.3.3	Waste management	Condition 10 Table 4	New numbering Revised to current licensing format.
1.3.8 and Table 1.3.4	Cover requirements	Condition 11 and Table 5	New numbering
1.3.9	Security	Condition 13	New numbering
1.3.10	Windblown waste management	Condition 12	New numbering
1.3.11 and Table 1.3.5	Infrastructure and equipment	Condition 2 and Table 2	Inclusion of new mill infrastructure and additional electrical generators as constructed under WA6532/2021/1 and updated figure numbers
1.3.12	Departing from requirements of design and construction of infrastructure	Condition 3	New numbering
1.3.13	Submission of construction compliance report	Conditions 4 and 5	Revised to current licensing format.
2.1.1	Record and investigate exceedances of limits or targets	Condition 24	New numbering
2.2.1 and Table 2.2.1	Emissions to air	Condition 14 and Table 6	Inclusion of additional electrical generators as constructed under WA6532/2021/1 and updated figure numbers
2.2.2 and Table 2.2.2	Point source emissions to air	Condition 15 and Table 7	New numbering and updated figure numbers
2.3.1	Fugitive emissions	Condition 16	New numbering and updated figure number
2.4.1 and Table 2.4.1	Emissions to land	Condition 17 and Table 8	New numbering and updated figure number

Existing condition	Condition summary	Revised licence condition	Conversion notes
3.1.1	General monitoring	Condition 18	New numbering Revised to current licensing format.
3.1.2	Definition of monitoring frequency	Condition 19	New numbering Revised to current licensing format Additional monitoring frequency definitions not previously incorporated in the old licence.
3.2.1 and Table 3.2.1	Monitoring of point source emissions to air	Condition 20 and Table 9	New numbering
3.3.1 and Table 3.3.1	Monitoring of tailing decant concentrations	Condition 21 and Table 10	New numbering Revised to current licensing format.
3.3.2	Monitoring standing water levels	Condition 22	New numbering Revised to current licensing format.
3.4.1 and Table 3.4.1	Process monitoring	Condition 23 and Table 11	New numbering
4.1.1	Recording information	Condition 28	New numbering Revised to current licensing format.
4.1.2	Control of site and distribution of information of conditions to premises workers	Remove	Redundant condition. Deleted from Licence
4.1.3	Submission requirement of AACR	Condition 26	New numbering Revised to current licensing format
4.1.4	Complaints management	Condition 25	New numbering Revised to current licensing format
4.2.1 and Table 4.2.1	AER reporting requirements	Condition 29 and Table 12	New numbering Revised to current licensing format
4.2.2	Inclusions within AER	Condition 30	New numbering
4.2.3 and Table 4.2.2	Non-annual reporting requirements	Condition 31 and Table 13	New numbering
4.3.1 and Table 4.3.1	Notification requirements	Condition 32 and Table 14	New numbering
Schedule 1: Maps	Premises map	Schedule 1: inclusion of figures 5, 6 and 7	New figures illustrate the inclusions of infrastructure constructed under WA6532/2021/1

## References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.