



Decision Document

Environmental Protection Act 1986, Part V

Proponent: Savannah Nickel Mines Pty Ltd

Licence: L7967/2003/6

Registered office: Level 9
553 Hay Street
PERTH WA 6000

ACN: 103 729 282

Premises address: Savannah Project
Mining Tenements M80/179, M80/180 and M80/181
WARMUN WA 6740

Issue date: Thursday, 31 July 2014

Commencement date: Saturday, 2 August 2014

Expiry date: Sunday, 1 August 2032

Decision

Based on the assessment detailed in this document the Department of Environment Regulation (DER), has decided to issue an amended licence. DER considers that in reaching this decision, it has taken into account all relevant considerations

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Licensing Officer

Decision Document authorised by: Tim Gentle
Delegated Officer



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1 Purpose of this Document

This decision document explains how DER has assessed and determined the application and provides a record of DER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DER's assessment and decision making under Part V of the *Environmental Protection Act 1986*. Other approvals may be required for the proposal, and it is the proponent's responsibility to ensure they have all relevant approvals for their Premises.

2 Administrative summary

Administrative details		
Application type	Works Approval ☐ New Licence ☐ Licence amendment ☒ Works Approval amendment ☐	
Activities that cause the premises to become prescribed premises	Category number(s)	Assessed design capacity
	5	50,000 tonnes per annual period
	6	100,000 tonnes per annual period
	54	200 cubic metres per day
	64	5,000 tonnes per annual period
Application verified	Date: N/A	
Application fee paid	Date: N/A	
Works Approval has been complied with	Yes ☐ No ☐ N/A ☒	
Compliance Certificate received	Yes ☐ No ☐ N/A ☒	
Commercial-in-confidence claim	Yes ☐ No ☒	
Commercial-in-confidence claim outcome	N/A	
Is the proposal a Major Resource Project?	Yes ☒ No ☐	



Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the <i>Environmental Protection Act 1986</i> ?	Yes ☒ No ☐	Referral decision No: Managed under Part V ☒ Assessed under Part IV ☐
Is the proposal subject to Ministerial Conditions?	Yes ☐ No ☒	Ministerial statement No: EPA Report No:
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the <i>Environmental Protection Act 1986</i>)?	Yes ☐ No ☒ Department of Water consulted Yes ☐ No ☒	
Is the Premises within an Environmental Protection Policy (EPP) Area Yes ☐ No ☒ If Yes include details of which EPP(s) here.		
Is the Premises subject to any EPP requirements? Yes ☐ No ☒ If Yes, include details here, eg Site is subject to SO ₂ requirements of Kwinana EPP.		

3 Executive summary of proposal and assessment

Savannah Nickel Mines Pty Ltd (the Licensee) is a wholly owned subsidiary of Panoramic Resources Limited (Panoramic). The Licensee processes nickel-copper-cobalt bearing ore by conventional crushing, milling and flotation plant to produce nickel concentrate. Operations at the Savannah Project (Savannah) currently consist of a decommissioned open pit, an operating underground mine, paste plant, processing plant with tailings and water storage facilities, supporting mine site infrastructure and an accommodation village. The current mineral resource is estimated to extend the Life of Mine (LOM) until 2018. Savannah is located approximately 40 kilometres (km) south of Warmun and 120 km north of Halls Creek. The process plant is currently designed to treat 950,000 tonnes of sulphide nickel/copper/cobalt ore per year.

The Licensee operates a Class II putrescible landfill, undertakes mine dewatering for underground operations and treats sewage from the Accommodation Camp. Treated wastewater is irrigated to an area of approximately 1.33 hectares (ha) located adjacent to the accommodation camp.

The Licensee has applied to amend the licence to gain approval for the disposal of 70 tonnes of tyres at two locations within the sites waste rock dumps (north waste rock dump (NWRD) and the south waste rock dump (SWRD)). The design capacity of category 64 does not require increasing as the 70 tonnes is captured within the approved 5,000 tonnes per annual period.

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

- Updated to reflect Departmental reform as published on DER's website under "Administrative changes implemented within the Department of Environment Regulation" www.der.wa.gov.au;
- Updated to reflect version 2.9 (v2.9) licence template;
- Administrative changes;
- Definitions updated;
- Reduction in approved site category design capacities as site has gone into 'Care and Maintenance' as of May 2016.
- Removal of reference to Class III for the putrescible landfill site;
- Previous condition L1.2.1 has been deleted;



- Removal of previous condition L1.2.3;
- Inclusion of condition L1.2.1;
- Inclusion of tyre disposal requirements in Table 1.2.1;
- Inclusion of L1.2.3 for cover requirements;
- Removal of bioremediation pad reference in Table 1.3.3;
- Removal of previous conditions L1.3.4 and L1.3.5 and L1.3.6;
- Inclusion of condition L1.2.8 for production or design capacity limits;
- Previous conditions L2.2, L2.4, L2.7, L2.8, L3.2, L3.4, L3.7 and L3.9 have been removed in line with v2.9 of the licence template;
- Removal of conditions L2.6.1 and L2.6.2;
- Inclusion of condition L3.2.1 for the monitoring of point source emissions to surface water;
- Inclusion of monitoring conditions in Table 3.3.1 for the wastewater treatment plant (WWTP);
- Inclusion of waste input monitoring in Table 3.4.1
- Inclusion of extra parameters and a requirement to monitor surface water quarterly in table 3.5.1;
- Removal of previous condition L4.1.1;
- Removal of previous condition L5.1.2
- Table 4.2.1 has been updated;
- Inclusion of condition L4.2.3 for non-annual reporting requirements; and
- Schedule 2 forms have been updated.

Where conditions have been added or removed to the existing Licence these have been justified in Section 4.



4 Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987* and DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision they are detailed in the decision document.

DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Premises category production capacities	N/A	As the Savannah Nickel Mine is moving towards Care and Maintenance (C&M) status the licensee has requested a decrease in production or design capacity for three of its four approved premises categories; - Category 5 capacity reduced from 950,000 tonnes per annual period to 50,000 tonnes per annual period. - Category 64 capacity reduced from 55,000 tonnes per annual period to 5000 tonnes per annual period. - Category 54 capacity reduced from 1880 cubic meters per day to 200 cubic meters per day. - Category 6 – no change to approved capacity. - Apart from a change in throughput, there will be no other variation to the premises operations. The methods of waste management, maintenance of the tailings and water storage facilities, and scheduled monitoring commitments will continue whilst Savannah is in C&M. Savannah will also continue to maintain records of its monitoring program and provide an Annual Report to the DER.	N/A.
General conditions	N/A.	Previous condition L1.2.1 has been removed. It is not a condition but an explanatory statement for the licensee. Previous condition L1.2.2 has been removed. This condition is a redundant condition and no longer is required to be on the licence. The condition is not enforceable as it's not sufficiently detailed or clear enough in what is required.	General provisions of the <i>Environmental Protection Act 1986</i>. Australian Standard 1940-



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		Previous condition L1.2.3 has been removed. The storage of environmentally hazardous materials is adequately regulated by the <i>Dangerous Goods Safety Act 2004</i> and associated Regulations. Unauthorised discharges of environmentally hazardous materials may be subject to the provisions of the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>. Previous condition L1.2.4 has been removed. This condition is a redundant condition no longer is required to be on the licence. Previous condition L1.2.5 has been removed. This condition is a redundant condition no longer is required to be on the licence. The condition is not enforceable as it's not sufficiently detailed or clear enough in what is required. Unauthorised discharge of contaminated stormwater is covered by the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>.	2004 The Storage and Handling of Flammable and Combustible Liquids. Code of Practice for the Storage and handling of dangerous goods. <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>
Premises operation	L1.2.1 – L1.2.8.	DER's assessment and decision making are detailed in Appendix A.	Email titled "Form P4 Amendment of Category 64 in L7967/2003/6 and associated W5208/2012/1, received from Mark Bantich, 13 November 2015
Point source emissions to surface water including	L2.2.1 and L3.2.1.	DER's assessment and decision making are detailed in Appendix B.	General provisions of the <i>Environmental Protection Act</i>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
monitoring			1986. <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>
Emissions to land including monitoring	L2.3.1, L2.3.2 and L3.3.1.	DER's assessment and decision making are detailed in Appendix C.	General provisions of the <i>Environmental Protection Act 1986</i> . <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>
Fugitive emissions	N/A.	Previous conditions L2.6.1 and L2.6.2 have been removed as these can be sufficiently regulated by section 49 of the <i>Environmental Protection Act 1986</i> . This is also in accordance with the administrative changes being implemented by DER outlined on DERs website www.der.wa.gov.au	General provisions of the <i>Environmental Protection Act 1986</i> . Website: der.wa.gov.au
Monitoring of inputs and outputs	L3.4.1.	The recording of waste inputs for the landfill and TSF1 have been included in the licence in Table 3.4.1. The Licensee will also be required to report this data in the Annual Environmental Report for assessment.	N/A.
Ambient	L3.5.1	The licensee currently monitors groundwater quality surrounding the TSF1 at four	N/A.



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
environmental quality monitoring		locations. Condition 3.5.1 has been updated to include an additional four parameters—Aluminium, Chloride and Zinc. These parameters have been added to allow for a more adequate suite of data to be collected to indicate the effects of seepage on the surrounding environment. This change also allows for consistency across other similar Nickel licences.	
Improvements	N/A.	Previous condition L4.1.1 has been removed. Please refer to Appendix B and C (Regulatory controls).	N/A.
Information	L4.1.1 – L4.1.3, L4.2.1 – L4.2.3 and 4.3.1.	Condition 5.1.2 of the original licence has been deleted. The condition was in regards to the person left in charge of the premises being aware of the conditions of the licence. This condition is unclear as to the requirements for compliance and it's the Licensee's responsibility to ensure they comply with the conditions of the licence regardless. Table 4.2.1 has been updated to align with licence conditions. Condition L4.2.3 has been included on the licence in line with v2.9 of the licence template for non-annual reporting requirements. Condition L4.3.1 has been updated in line with v2.9 of the licence template and previous conditions L1.3.6(c) has been removed and is now covered under Table 4.3.1. The licensee has notified DER that the site will enter into a 'care and maintenance' phase in May 2016. Therefore a requirement has been added to table 4.3.1 to ensure that DER is notified when recommencement of operations occur.	N/A.
Licence duration	N/A.	The duration of the licence has been extended to 1 August 2032 (from 1 August 2019) in accordance with DER's <i>Guidance statement: Licence Duration</i> .	DER Guidance Statement: Licence duration (Final November 2014, Revised May 2015)



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
26/04/2016	Proponent sent a copy of draft instrument	No comments received	Not applicable
6/05/2016	Copy of draft instrument sent to the following for comment: • Department of Water; and • Department of Mines and Petroleum	No comments received from DMP Comments received from DoW - DoW has no objections to disposal of tyres within waste rock dumps - DoW has suggested that monitoring of surface water quality be included in the Part V operating licence as it is not regulated by DoW under the RIWI Act 1914 as SNM do not hold a surface water licence.	Monitoring of surface water conditions have been added to the licence.



6 Risk Assessment

Note: This matrix is taken from the DER Corporate Policy Statement No. 07 - Operational Risk Management

Table 1: Emissions Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Moderate	Moderate	Moderate	High
Rare	Low	Low	Moderate	Moderate	High



Appendix A

Premises operation

Removal of reference to Class III putrescible landfill site. In accordance with the former Department of Environment and Conservation *Landfill Waste Classification and Waste Definitions 1996* (As amended December 2009) a Class III landfill is a lined landfill, which may include leachate collection, designed to accept putrescible and inert wastes. The landfill at the Project is a Class II un-lined landfill designed to accept putrescible and inert wastes.

Condition L1.2.1 has been added to the licence to ensure any limit exceedances in this section are investigated.

Waste Rock Dumps – Tyre disposal

The Licensee is proposing to dispose of up to 70 tonnes of tyres into the south and north waste rock dumps (WRD). Depth to groundwater at the WRDs is approximately 30 metres below ground level (mbgl). The tyres will be transported from the maintenance departments and deposited at the base of the WRDs and covered in-situ as quickly as possible.

Tyres are to be buried in accordance with Regulation 14(2) of the *Environmental Protection Regulations 1987*. A limit of 70 tonnes per annual period of tyres to be disposed of in the WRDs has been added to the licence and conditions have been added to Table 1.2.1 for tyre disposal.

Condition L1.2.3 has been added to the licence for the cover requirements for the landfill waste and tyres in the WRDs.

The design capacity of category 64 does not require increasing as the 70 tonnes is captured within the approved 5,000 tonnes per annual period.

Other conditions

Previous condition L1.3.4 has been removed. The WWTP is a reactive tank system which is fully enclosed. The location is wrapped around by an earthen bund to contain runoff. These conditions are not applicable.

Previous condition L1.3.6 and the notification requirement in table 4.3.1 have been removed. The Licensee regularly undertakes emergency response training which includes burning materials in firefighting exercises. The previous conditions required the Licensee to undertake burning of waste in a low permeability compound and to collect all firewater and to notify the Director three days prior to the training. This activity is not a prescribed activity or a contributory activity and therefore does not require regulation. This is in accordance with DERs *Guidance statement: Licensing and works approvals process*. General provisions of the *Environmental Protection Act 1986* and the *Environmental Protection (Unauthorised Discharge) Regulations 2004* apply.

Previous condition L1.3.5 has been removed. The bioremediation facility is not a prescribed activity or a contributory activity (as defined in the *Guidance statement: Licensing and works approvals process*) and therefore does not require regulation. Recent inspection reports for the site indicate there have been no issues with the bioremediation facility. It has therefore been deemed low risk to the environment and the conditions have been removed. General provisions of the *Environmental Protection Act 1986* and the *Environmental Protection (Unauthorised Discharges) Regulations 2004* apply.

Previous condition L1.3.6(c) has been removed and is now covered under Table 4.3.1 for notification requirements.



The recording and the establishment of limits for process throughputs has been included in the licence through condition L1.3.9 – Production or design capacity limits. This has been included to ensure the Licensee does not exceed the approved throughputs for each category of the licence.



Appendix B

Point source emissions to surface water including monitoring

Historically, the Water Storage Facility's (WSF) primary function was for the collection and storage of clean water at Savannah and to act as an environmental buffer between seepage from the TSF and the local creek system (Mine and Fletcher Creeks) downstream of the WSF. The majority of seepage water from either the TSF or WSF that reports at the base of the WSF embankment is returned to WSF1.

Minor groundwater seepage and surface water inflow to the open pit is directed into the underground operations through sink holes at the base of the pit. Water is then abstracted from the underground operations in order to maintain safe mining conditions below the water table. "Clean" water (free of suspended solids) from the open pit is transferred via a pipeline to the WSF. "Dirty" water (water with suspended solids) from the underground operations is transferred to the Tailings Storage Facility (TSF) via the underground dewatering system.

WSF1–3, receives rainfall run-off from the local catchment and within the mine, as well as groundwater abstracted from the Savannah borefield. Occasionally, the WSFs also receive rainfall run-off collected in the Savannah pit. Water held in the WSFs is the primary water supply source for the site's process plant. The water circuit involves WSF2 receiving water from the paste plant and the underground mine for reuse back underground, in the paste plant and for site dust suppression activities. WSF3 receives seepage recovery water and excess borefield water, which is used in the processing plant. The water circuit allows for water to be pumped between the two facilities.

WSF1 is currently dewatered as part of the *Savannah Nickel Project Operating Strategy*, prepared by RPS Aquaterra Pty Ltd for Savannah Nickel Mines Pty Ltd, 20 November 2013 (Operating Strategy), which was approved by the Department of Water (DoW) on 30 January 2014. WSF1 has a storage capacity of up to 136,000 kilolitres (kL), however to minimise seepage the level in WSF1 is maintained at around 70,000 kL storage level (approximately one month's process demand).

WSF1 is located within the Mine Creek catchment. Stoney Creek and Mine Creek both drain into Fletcher Creek that in turn drains into the Ord River, approximately 12 km south. The Ord River then flows into Lake Argyle, a Ramsar wetland.

Mine Creek is considered to be a category three highly disturbed system. It is an ephemeral drainage line with no known, social or cultural values. Surface water quality downstream of the TSF and WSF1 has been significantly impacted by historic seepage and overflow events, with sulfate concentrations ranging between 700 and 1,900 mg/L (average 1,300 mg/L). Bicarbonate alkalinity is reduced and nickel concentrations are elevated in Mine Creek downstream of the TSF and WSF1 as a result of seepage and overflows.

To assist in reducing water stored in WSF1 (and to minimise seepage) a diversion embankment was constructed within WSF1 during the stage 1 lift (2011) to divert surface water flow from the undisturbed southern portion of the Mine Creek catchment. Runoff will flow via the existing spillway to join Mine Creek downstream of WSF1 (Figure 1). The WSF1 diversion embankment weir was constructed in 2011 and has a catchment area of 25 hectares (ha). The internal WSF1 weir is 1 m higher than the existing emergency spillway cutting. The intent of the design is to divert clean, upstream runoff through the emergency spillway into Mine Creek.



Figure 1: WSF1 and Spillway

The internal WSF1 weir has been designed to overtop during larger storm events (1:1000 year event; 320mm in 24hr event) in order to maintain safety and integrity of the main WSF1 embankment. The Licensee has stated that due to revised water management controls, the internal WSF1 weir is not likely to overtop unless a large and extreme storm event occurs (1:1000 year event). If overtopping of the internal WSF1 weir were to occur, then clean, unaltered water would likely already be exiting the WSF1 through the original wall cutting emergency spillway. The Licensee has stated that in the event that altered water overtops the internal diversion embankment wall, this water would be highly diluted with fresh, clean rainwater which would then mix with cleaner upstream Mine Creek water already exiting the spillway.

Emission: Overflow from WSF1 from emergency spillway to Mine Creek and seepage of stored water from WSF1 to Mine Creek.

Impact: Reduction in surface water quality, local groundwater and localised groundwater mounding. Historical data for Mine Creek has shown elevated concentrations of salinity and major ions including sulfate as a result of background hydrogeology and impacts from mining activities including seepage from the TSF. Mounding associated with the solute plume may result in inundation of plant roots, though due to the natural variation of ecosystems in the Kimberley as a result of extreme wet and dry fluctuations and subsequent adaptation of ecosystems to these conditions, it is unlikely vegetation will be adversely affected.

Controls: (to minimise seepage and to prevent overflow of WSF1)



- The internal WSF1 weir has been designed to overtop during large storm events (1:1,000 year event; 320 mm in 24 hour event) in order to maintain safety and integrity of the main WSF1 embankment;
- The spillway has been engineered to minimise erosional impacts and prevent overtopping of the facility's main embankment;
- The base of the WSF embankment seeps water into a small artificial wetland, which contains a sump and recovery pump;
- Seepage is recovered into WSF1 and then pumped into WSF2 and WSF3 to be used within the processing water circuit;
- Seepage recovery bores are operated and will continue to be operated during the care and maintenance phase while the water mound drains down; and
- Natural flows from the undisturbed upper catchment of Mine Creek are diverted into the lower section of Mine Creek to dilute solute concentrations in downstream surface water.

Risk Assessment

Consequence: Minor

Likelihood: unlikely

Risk Rating: Moderate

Regulatory Controls

Previous condition 4.1.1 (IR3) has been removed. This improvement condition required the licensee to develop and submit to the CEO, parameter standards, including but not limited to, pH, Total Dissolved Solids, Nickel, Sulfate and Copper, suitable for use as targets and limits for the discharge of water from WSF1 spillway into mine creek. The Licensee submitted an email titled L7967/2003/6 – *Improvement Programme* received from Mark Bantich, 23 December 2014.

To replace improvement condition IR3 the following conditions have been added to the licence during this June amendment;

- Condition L3.2.1 has been added to the licence for the monitoring of point source emissions to surface water associated with the overflow discharge from the spillway to Mine Creek. The Licensee will be required to monitor the volume of water and quality of water discharged from the spillway to Mine creek during overtopping events;
- Condition 3.5.1 (Table 3.5.1) has been updated to include surface water monitoring at 5 points along Mine and Fletcher creeks on a quarterly basis. This will ensure that the environmental impact of overflow events and seepage from the WSF1 are monitored by DER. Currently the Licensee already undergoes this monitoring as part of their Savannah Nickle Mine Water Operating Strategy, required by the Department of Water.

Residual Risk

Consequence: Minor

Likelihood: unlikely

Risk Rating: Moderate



Appendix C

Emissions to land including monitoring

Emission: Discharge from the Accommodation Camp WWTP to a 1.33 ha spray irrigation.

Impact: Contamination of surrounding environment and potential impacts on the ecology of ground and surface water from the addition of nutrients. The WWTP and spray irrigation area are 200 m and 500 m from the village bore respectively. Depth to groundwater is closely related to topographic elevation and seasonal recharge. Seasonal variations of 3 – 15 m occur as a result of direct infiltration and local recharge.

Controls:

- Designed to treat wastewater to a secondary treatment level;
- The design and slope of the irrigation field is such that the western perimeter is higher than the eastern perimeter, which prevents excess water flowing into the field during the wet season;
- The irrigation field consists of seven irrigation lines each with several 1 metre high sprinklers for effective evaporation; and
- The lines are utilised on a rotational basis to ensure the surrounding soil does not become waterlogged.

Risk Assessment

Consequence: Minor

Likelihood: Unlikely

Risk Rating: Moderate

Regulatory Controls

Previous condition 4.1.1 (IR1 and IR2) have been removed. The Licensee submitted an email titled L7967/2003/6 – *Improvement Programme* received from Mark Bantich, 25 October 2014 for the monitoring programme for the irrigation of WWTP wastewater. The program outlined a monitoring schedule and targets in line with the *National Water Quality Management Strategy, Australian Guidelines for Sewerage Systems - Effluent Management*, Agriculture and Resource Management Council of Australia and New Zealand and Australian and New Zealand Environment and Conservation Council, 1997 (NWQMS 1997).

Condition L3.3.1 has been added to the licence and requires the Licensee to monitor the effluent quality of the wastewater quarterly and report these results in the Annual Environmental Report along with an assessment and comparison against the NWQMS 1997. Limits have not been added to the licence; instead the comparison required by condition L4.2.1 will allow DER to see trends in the WWTP performance over time and will make changes if required.

A condition (L1.2.5) already exists on the licence that requires the Licensee to manage the irrigation of treated wastewater appropriately (minimise run-off and soil erosion and maintenance of vegetation cover). The WWTP and spray irrigation field is also subject to regular compliance inspections to ensure they are being managed appropriately.

Residual Risk

Consequence: Minor

Likelihood: Rare

Risk Rating: Low