



Licence number	L9009/2016/1
Licence holder	Northern Minerals Limited
ACN	119 966 353
File number	DER2016/002134-1~1
Premises	Browns Range Rare Earths Project Mining Tenement M80/627 STURT CREEK WA 6770
Date of report	4 September 2020
Decision	Final

1. Definitions and interpretation

Key terms relevant to this decision report and their associated definitions are listed in the following table.

Term	Definition
AER	Annual Environment Report
Amendment Report	refers to this document
ARI	Average Recurrence Interval
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer CEO for the purposes of notification means: Director General Department administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 JOONDALUP DC WA info@dwer.wa.gov.au
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act
DER	former Department of Environment Regulation
DMIRS	Department of Mines, Industry Regulation and Safety
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986</i> (WA)
EP Regulations	<i>Environmental Protection Regulations 1987</i> (WA)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
HDPE	high density polyethene
kL	kilolitres
Licence holder	Northern Minerals Limited
Minister	the Minister responsible for the EP Act and associated regulations
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Report applies, as

Term	Definition
	specified at the front of this Amendment Report.
PSD	Particle Size Distribution
RMP	Radiation Management Plan
Revised Licence	the amended Licence issued under Part V, Division 3 of the EP Act, with changes that correspond to the assessment outlined in this Amendment Report.
Risk Event	as described in <i>Guidance Statement: Risk Assessment</i>
ROM	run of mine
SAG Mill	Semi-Autogenous Grinding Mill
SG	Specific Gravity
tpa	tonnes per annum
tph	tonnes per hour
TSF	Tailings Storage Facility
XRT	X-ray Transmission

2. Amendment Description

The following guidance statements have informed the assessment and decision outlined in this Amendment Report.

- *Guidance Statement: Regulatory Principles (DER, 2015a)*
- *Guidance Statement: Setting Conditions (DER, 2015b)*
- *Guidance Statement: Licence Duration (DER, 2016a)*
- *Guidance Statement: Environmental Siting (DER, 2016b)*
- *Guidance Statement: Risk Assessment (DWER, 2017b)*
- *Guidance Statement: Decision Making (DWER, 2019a)*
- *Guideline: Industry Regulation Guide to Licensing (DWER, 2019b).*

2.1 Purpose and scope of assessment

On 15 May 2019, the licence holder submitted a licence amendment application to DWER for L9009/2016/1 to:

- install an ore sorting circuit, located between the primary crusher and the Semi-Autogenous Grinding Mill (SAG Mill);
- increase the total throughput of the pilot plant from 80,000 tonnes per annum (tpa) to 131,490 tpa; and
- correct the evaporation pond freeboard limit to minimum freeboard of 300 mm below spillway invert (administrative change).

The ore sorting circuit is to be located partly within the existing pilot plant and partly on the existing run of mine (ROM) pad (**Figure 1**) between the primary crusher and the SAG Mill (**Figure 2**). The circuit comprises the following stages:

- **Screening:** Crushed ore from the existing primary crusher is stored in a crushed ore bin which feeds to the classification screen. The classification screen separates the oversized material for recycling back through the existing crushing circuit.
- **Ore washing:** The ore washing screen and clarifier (sediment buster) removes sludge (Fines material) from the ore and allows 'clean' water to be recycled in the wash cycle. The sludge is sent to the Select Stockpile for processing and the washed ore is sent for final sorting.
- **Ore sorting:** The ore sorting circuit operates by identifying individual rocks and analysing density via X-ray Transmission (XRT). Compressed air is then used to sort high-grade from low-grade ore by physically moving rocks into each stream.
- Associated uncovered conveyors transporting sorted and unsorted ore between each stage or to a bypass stockpile if the ore sorter is offline.

The ore sorting circuit will allow the SAG Mill to be operated more efficiently by reducing the average particle size of feed ore. This will allow the target grind size to be achieved at a lower power input. Therefore, an increase in throughput of the processing plan from 10 tonnes per hour (tph) to 15 tph is able to be achieved, resulting in an increase in design capacity (Category 5) from 80,000 tpa to 131,490 tpa.

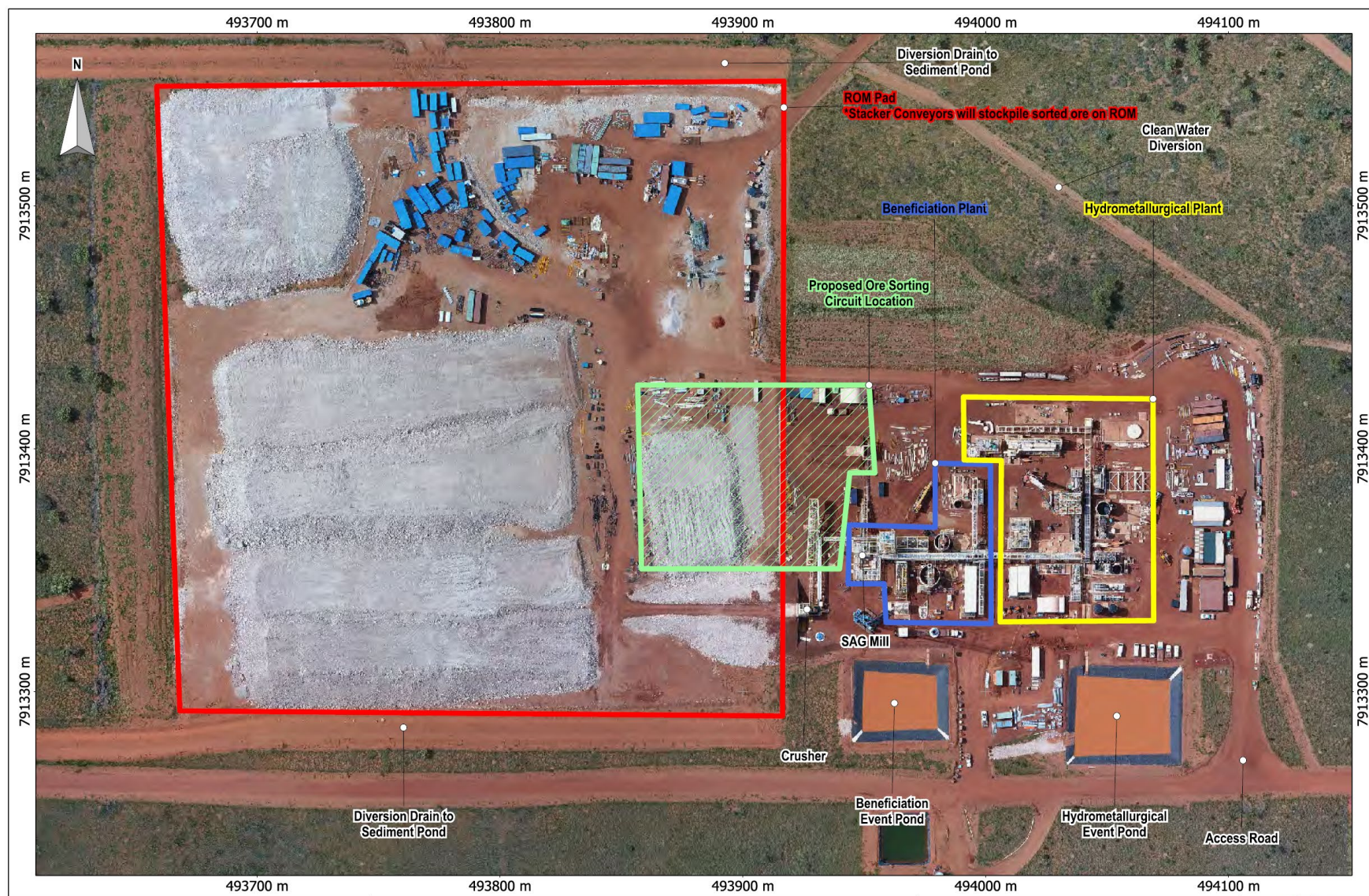


Figure 1: Site layout plan

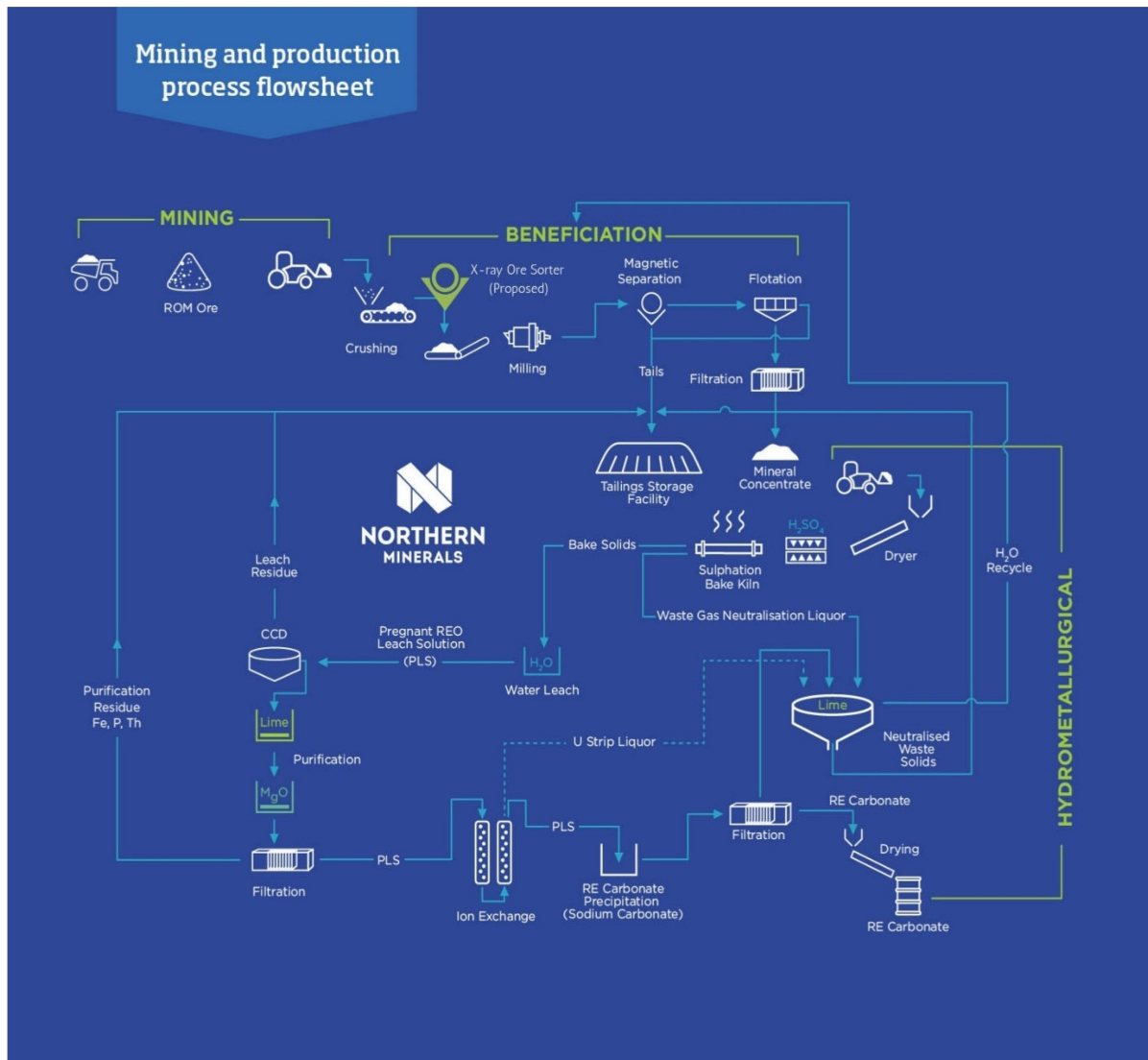


Figure 2: Mining and production flow diagram (simplified)

3. Legislative context and other approvals

The legislative framework for this assessment is the *Environmental Protection Act 1986* (EP Act) and *Environmental Protection Regulations 1987* (EP Regulations).

Relevant guidance documents are outlined in Appendix 1: Key documents.

Approvals relevant to the premises are outlined in the table below.

Legislation	Number	Approval
<i>Mining Act 1978</i>	ID 80975	Mining Proposal Amendment - under assessment
<i>Environmental Protection and Biodiversity Conservation Act 1999</i>	EPBC 2019/8446	Assessment of possible nuclear action - under assessment
	EPBC 2014/7253	Assessment of full mine – not a controlled action
<i>Radiation Safety Act 1975</i>	To be submitted	Radiation Management Plan (RMP)
Part IV of the <i>Environmental Protection Act 1986</i>	MS 986 EPA Report 1523	Issued 20 October 2014 Section 45C change to conditions granted for the ore sorting circuit on 4 September 2020.
<i>Rights in Water and Irrigation Act 1914</i>	GWL177452(5)	Authorised abstraction of 292,160 kiloliters (kL) of groundwater
Radiological Council of Western Australia	RS 73/2012 22222	Project registered with the Radiological Council of Western Australia

4. Licence history

The following table provides the licences and works approvals issued for the Premises since 24 September 2015.

Instrument	Issued	Amendment
W5837/2015/1	24/09/2015	New Works Approval for category 64 landfill and category 85 sewage facility for full scale operations.
W6007/2016/1	13/03/2017	New Works Approval for category 5 pilot plant trial.
L9009/2016/1	11/07/2018	New Licence application to include the operation of the pilot plant trial and putrescible landfill.
L9009/2016/1	04/09/2020	Revised Licence: Increase in throughput capacity, install an ore sorting circuit, and correct the evaporation pond freeboard limit.

5. Location and receptors

The following table lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Residential and sensitive premises	Distance from Prescribed Premises
Kundat Djaru (Ringer Soak) settlement	35 km to the west/northwest

The following table lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Environmental receptors	Distance from Prescribed Premises
Banana Springs	15 km west
Groundwater	14 mbgl
Surface water	Sturt Creek approximately 45 km west/northwest

6. Risk assessment

Sections 6.1 and 6.1 describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both sections identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

6.1 Risk assessment for proposed amendments during construction

Risk Event				Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities*	Potential emissions	Potential receptors, pathway and impact	Licence holder controls					
Construction of ore sorter circuit and associated equipment	Dust	Air/windborne pathway causing impacts to health and amenity of closest human receptors at Ringer Soak, approximately 35 km west northwest from the premises, and water quality on Banana Springs located 15 km from premises	Nil	Slight	Unlikely	Low	The Delegated Officer considers the risk of dust impacts during construction to be low as the nearest sensitive receptor is 15 km west of the premises. Construction is within an existing mine and for a finite period of time.	Nil
Construction of stormwater infrastructure Vehicle movements	Noise						The Delegated Officer considers the risk of noise impacts during construction to be low as the nearest sensitive receptor is 15 km west of the premises. Construction is within an existing mine and for a finite period of time.	The Delegated Officer considers the <i>Environmental Protection (Noise) Regulations 1997</i> sufficient to regulate noise emissions from the premises.

¹. Consequence ratings, likelihood ratings and risk descriptions are detailed in the Department's Guidance Statement: Risk Assessments (February 2017)

6.2 Risk assessment for proposed amendments during commissioning and operation

Risk Event				Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities*	Potential emissions	Potential receptors, pathway and impact	Licence holder controls					
Screening activities (resulting from ore sorting circuit) Increased handling of ore: conveyors, unloading, loading and storage of material (i.e. crushed ore bin) and vehicle movements (increase in number of Front End Loaders from one to two)	Dust	Air/windborne pathway causing impacts to health and amenity of closest human receptors at Ringer Soak, approximately 35 km west northwest from the premises and water quality on Banana Springs located 15 km from premises boundary	Screening and ore handling mitigation measures include: - At the initial screening stage, there will be partial dust enclosures above the screen and sprays and fogging bars beneath the screen. - Sufficient moisture added to fines stream separated at the initial screening stage during handling and stockpiling. - Preferential processing of fines and high grade (select) ore so that material is stockpiled for shorter periods. - Wash the 'sized' ore after the initial dry screening stage to remove fine particles prior to sorting in the new ore sorting circuit, removing dust from the high grade (select) or low grade (rejects) material.	Slight	Possible	Low	The Delegated Officer considers the risk of increased dust impacts are low as the nearest sensitive receptor is 35 km west of the premises. No dust is generated inside of the XRT ore sorting unit as this dust would interfere with the operation of the X-ray system. Measures to mitigate dust inside the ore sorter mitigates dust generation from operation of the ore sorting circuit. The Delegated Officer notes that current dust management of water trucks and a sprinkler system used to suppress dust emissions from stockpiles, and water trucks used to water the haul roads and access roads would be sufficient for any additional vehicle movements and ore handling. The proposed controls are sufficient to mitigate dust emissions from the ore circuit.	Nil.
	Noise	Air/windborne pathway causing impacts to health and amenity of closest human receptors at Ringer Soak, approximately 35 km west northwest from the premises	Standard noise abatement measures such as dampers and mufflers included in the design of the ore sorting circuit.	NA	NA	NA	The Delegated Officer considers there is no risk of noise impacts as the nearest sensitive receptor is the Ringer Soak Community approximately 35 km west northwest of the Project, so is unlikely to be affected by noise from the proposed works. The proposed controls are sufficient for mitigating noise emissions.	The Delegated Officer considers the <i>Environmental Protection (Noise) Regulations 1997</i> sufficient to regulate noise emissions from the premises.

Risk Event				Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities*	Potential emissions	Potential receptors, pathway and impact	Licence holder controls					
Screening activities (ore washing)	Discharge to land (sediment)	Overland runoff causing impacts such as downstream sedimentation to surface water drainage areas from the increase of suspended solids into the environment	Wash water from the wash screen and clarifier will be stored in a 5 m³ tank before being pumped back to the wash screen and reused. Sludge from the wash screen and clarifier is deposited via conveyor to the Select Stockpile. In the event there is a rupture of piping or spill from a conveyor, the wash water and sludge are captured by the ROM pad drainage system. All surface water flows off the ROM pad are captured in drains and directed to a sediment retention pond.	Minor	Rare	Low	The Delegated Officer considers the risk of discharge to land from ore washing activities to be low as wash water in the ore sorting circuit is reused and not discharged, and any spill of material would be captured within the ROM pad drainage system. The proposed controls are sufficient for mitigating emissions from screening activities.	Existing Condition 1.2.1, general conditions
Storage of ore material (overall reduction in particle size of stockpiled ore)	Contaminated stormwater/ groundwater and wind-blown waste	Overland runoff causing impacts such as downstream sedimentation to surface water drainage areas from the increase of suspended solids into the environment Leaching of ore material from ROM pad pathway causing changes to groundwater quality, approximately 14 mbgl and water quality on Banana Springs located 15 km from premises boundary Impacts to adjacent vegetation health from dust deposition.	Ore is stored at the ROM pad on a compacted engineered base. Average particle size of stockpiled material will reduce with the addition of the ore sorter. Stockpiles of Fines (<10 mm) are likely to contain particles small enough to disperse in stormwater during rainfall events or be blown by wind onto the surrounding area. Discharge will be managed by: - Sufficient moisture added to Fines during handling and stockpiling - processing most, if not all, of the Fines preferentially; and - locating the active Fines stockpiles away from the edges of the ROM pad. Existing stormwater is managed in accordance with a Surface Water Management Plan (Golder Associates 2017). Run-off from the pilot plant area is captured in HDPE-lined Event Ponds designed for a 1 in 20-year ARI, 24-hour event. Run-off from the ROM Pad is captured in stormwater drains draining to a Sediment Retention Pond, which is designed for a 1 in 20-year ARI, 24-hour event. The applicant will maintain Sediment Retention Ponds as required to ensure sufficient capacity for sediment capture.	Minor	Unlikely	Low	The Delegated Officer considers the risk of contaminated stormwater from storage of ore material to be low as run-off will be directed to the existing ROM pad drainage system. The Delegated Officer considers the risk of leaching from storage of ore on the ROM pad to be unchanged as the ore material to be stored is chemically identical to the existing operations and would pose a similar environmental risk of seepage. The Delegated Officer notes the risk of vegetation smothering is low as it is likely that the vegetation at the Premises has a high natural dust. The proposed controls are sufficient for mitigating emissions from storage of ore material.	Existing Condition 1.2.1, general conditions
Increased raffinate production discharging to the existing evaporation pond	Contaminated stormwater, spills	Overland runoff causing impacts such as downstream sedimentation to surface water drainage areas from the increase of suspended solids into the environment	Existing Evaporation Pond design includes a double liner consisting of 300 mm of compacted soil and 1.5 mm high density polyethylene (HDPE). Maintain a minimum freeboard of 300 mm below the spillway invert sufficient to contain a 1 in 100-year ARI, 72-hour event. Monitoring bores are already established around the Evaporation Pond. A greater volume of process water may be spilled in the event of a pipeline breach. Mitigation measures include: - pipeline corridor inspections at least once per shift (12-hours) during operations - combined bunded corridor and associated catch pits sufficient to contain any spills between inspections.	Minor	Unlikely	Medium	The Delegated Officer considers the risk of discharge to land from increased wastewater treatment remains at medium as the increased rate could increase the amount of raffinate spilled if a pipeline ruptures. The Delegated Officer considers that the risk of discharge to land from deposition into the existing evaporation pond is low as the freeboard for a 1 in 100 ARI, 72 hour event (300 mm below spillway invert) will be maintained. The proposed controls are sufficient for mitigating emissions from increased raffinate production.	Existing Condition 1.2.1, general conditions Existing Condition 1.3.6, management of pipelines Existing Condition 1.3.7, inspection of infrastructure modified frequency to include an inspection once each 12-hour period during operation Existing Condition 2.4.1, monitoring of ambient groundwater quality

Risk Event				Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities*	Potential emissions	Potential receptors, pathway and impact	Licence holder controls					
Increased throughputs in upstream and downstream stages of the existing pilot plant such as: - crushing circuit and conveyor - SAG Mill feed and conveyor - Beneficiation Concentrate Stockpiles - Kiln and baked product.	Air emissions	Air/windborne pathway causing impacts to health and amenity of closest human receptors at Ringer Soak, approximately 35 km west northwest from the premises, and water quality on Banana Springs located 15 km from premises.	Standard dust abatement measures such as sprays are in place to minimise dust generation from the crusher. Dust from the SAG Mill feed and conveyor is currently mitigated using sprays. These sprays are expected to be sufficient to minimise dust from increased amount of ore being fed into the mill. Water is added in the mill stage. Beneficiation concentrate is passed through a filter press which reduces moisture content to approximately 35% before it is stockpiled for processing. Natural drying of stockpiles prior to further processing may reduce moisture content to 15 – 20% which limits the propagation of dust. The kiln is operated under negative pressure to reduce dust generation during the stages of drying the beneficiation concentrate, mixing with sulfuric acid and baking in the kiln. Emissions from the kiln waste gas system are proportional to the volume of air intake through the kiln. Increasing the throughput of the pilot plant is therefore not expected to significantly increase concentrations of gaseous emissions through the waste gas stack. After baking in the kiln, the rest of the processing is a wet process with limited potential for dust generation.	Slight	Unlikely	Low	The Delegated Officer considers the risk of air emissions remains low as while some dust emissions and other emissions (such as kiln gases) may increase, the impact to the nearest sensitive receptor 15 km west of the premises is not considered to increase. The proposed controls are sufficient for mitigating air emissions.	Nil
	Chemical discharge, spills	Spills of chemicals resulting in stormwater contaminated by chemicals/hydrocarbons causing soil, groundwater and surface water receptors; leading to ecosystem disruption.	No new reagent storage tanks are proposed. An increase of deliveries to cover the anticipated extra demand will occur. For the existing Beneficiation Circuit, there will be an approximately 20% increase in flotation reagents and for the existing Hydrometallurgical Circuit, there will be an approximately 44% increase in sulfuric acid and hydrated lime. The amount of magnesium oxide and ferric sulfate will reduce as the higher-grade ore will require less purification treatments.	Minor	Unlikely	Medium	The Delegated Officer considers the risk of discharge to land remains medium as the nearest sensitive receptor is 15 km west of the premises. Storage is less than 1000 m³ in aggregate and therefore will not trigger Category 73 (Bulk storage of chemicals). The proposed controls are sufficient for mitigating emissions to land.	Existing Condition 1.2.1, general conditions

Risk Event				Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities*	Potential emissions	Potential receptors, pathway and impact	Licence holder controls					
Tailings: increase in rate of tailings discharge	Tailings discharge, spills	Overland runoff (overtopping of TSF and pipeline rupture) causing impacts to onsite flora, surface water and threatened fauna from the increase of suspended solids into the environment	Adhere to minimum freeboard requirements in Licence L9009/2016/1 and <i>Pilot Plant, Tailings Storage Facility and Evaporation Pond operating manual</i> (Knight Piesold, 2018) to ensure no discharge from the TSF after a 1 in 100-year ARI, 72-hour event. Immediately clean up/dispose spills of tailings or process slurries outside of engineered containment systems in accordance with Condition 1.2.1 of Licence L9009/2016/1. A greater volume of tails may be spilled in the event of a pipeline breach. Mitigation includes: - pipeline corridor inspections at least once per shift (12-hours) when tailings deposited - combined bundled corridor and associated catch pits sufficient to contain any spills between inspections.	Minor	Unlikely	Medium	The Delegated Officer considers that the risk from a slight increased rate of tailings discharge to the TSF remains at medium as, while the ultimate predicted tailing storage volume is not expected to change, the increased rate could increase the amount of tailings spilled if a pipeline ruptures. The Delegated Officer considers that the risk of discharge to land from overtopping is low as the freeboard for a 1 in 100 ARI, 72 hour event (300 mm below spillway invert) will be maintained. The proposed controls are sufficient for mitigating emissions to land.	Existing Condition 1.2.1, general conditions Existing Condition 1.3.6, management of pipelines Existing Condition 1.3.7, inspection of infrastructure modified frequency to include an inspection once each 12-hour period when tailings is being deposited Existing Condition 2.4.1, monitoring of ambient groundwater quality
	Discharge to groundwater (seepage)	Increased leaching of tailings from TSF pathway causing changes to groundwater quality, approximately 14 mbgl and water quality on Banana Springs located 15 km from premises boundary	Seepage through the TSF base and embankments is currently mitigated by a double liner (300 mm of compacted soil and 1.5 mm HDPE) and an underdrainage collection and recovery system above the liner. The permeability of the consolidated tails is likely to be between 10-8 to 10-9, indicating that any seepage from the tailings will be low.	Minor	Unlikely	Medium	The Delegated Officer considers the risk of the increased rate in tailings leading to a greater amount of seepage remains at medium as the nearest sensitive receptor is 15 km west of the premises and depth to groundwater is 14 mbgl. With the increased rate of tailings, the hydraulic head would likely increase, increasing the seepage rate. As such the Delegated Officer considers that a water balance is required to monitor and manage risk of mounding from the increased rate of tailings discharge. The existing controls (compacted soil base, HDPE liner, underdrainage system, decant tower for removal of supernatant water, daily inspections, groundwater monitoring) are sufficient to continue mitigating emissions to water.	Existing Condition 1.3.4, Table 1.3.3, containment infrastructure New Condition 1.3.9, water balance
Tailings: geotechnical characteristics	Discharge to groundwater (seepage)	Change in geotechnical properties of tailings reporting to the TSF pathway causing changes to groundwater quality, approximately 14 mbgl	Geotechnical characteristics of tailings are not expected to change significantly with the addition of the ore sorter. Testing on a pilot plant tailings bench sample undertaken by Knight Piesold (2019) shows that there is no significant influence on the Particle Size Distribution (PSD) and the Specific Gravity (SG) compared to a current tailings sample. Further testing of an operating tailing sample will be undertaken prior to construction of the larger scale plant.	Moderate	Possible	Medium	The Delegated Officer considers the risk of change to tailing geotechnical characteristics is medium as the physical properties of the tailings are expected to be comparable to current tailings physical properties.	Existing Condition 1.3.4, Table 1.3.3, containment infrastructure New Condition 1.3.9, water balance
X-rays from ore sorting circuit	Electromagnetic radiation	Presence of X-rays pathway causing impacts to health and amenity of closest human receptors at Ringer Soak, approximately 35 km west northwest from the premises	Browns Range is a registered premise under the <i>Radiation Safety Act 1975</i> and Registration RX 76/2018 will be updated to include the X-ray source in the ore sorting unit.	NA	NA	NA	The Delegated Officer considers there is no risk from electromagnetic radiation as the nearest sensitive receptor is approximately 35 km west southwest from the premises.	Nil

Risk Event				Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities*	Potential emissions	Potential receptors, pathway and impact	Licence holder controls					
Increased radionuclide amount in tailings discharge	Electromagnetic radiation	Tailings containing up to 3 Bq/g of radioactive material (increase from 1 Bq/g) pathway causing impacts to health (increased radiation doses) of closest human receptors, approximately 35 km west southwest from the premises, and fauna using the TSF	The decant pond will be kept as small as possible in accordance with the Pilot Plant, Tailings Storage Facility and Evaporation Pond operating manual (Knight Piesold, 2018) to reduce risks associated with exposure to tailings water. Tailings will be drained, dried and covered at closure to prevent access to tailings water.	Slight	Unlikely	Low	The Delegated Officer considers that the risk of increased electromagnetic radiation is low as the nearest sensitive receptor is 35 km west southwest from the premises. Fauna could come into direct contact with the increased electromagnetic radiation in the form of TSF decant water, however, the proposed controls are sufficient for mitigating electromagnetic radiation to fauna to as low as reasonably achievable. The Delegated Officer notes that radiation doses to personnel is regulated by the Department of Mines, Industry Regulation and Safety (DMIRS). The licence holder is liaising with DMIRS, and a revised Radiation Management Plan and Radioactive Waste Management Plan have been approved by DMIRS.	Nil
	Dust	Air/windborne pathway causing impacts to health and amenity of closest human receptors at Ringer Soak, approximately 35 km west northwest from the premises, and water quality on Banana Springs located 15 km from premises	The potential for dust generation from the TSF will not change as a result of the proposed works as the surface area of the TSF; however, the radionuclide concentrations of the tailings and any generated dust are expected to increase. Wet deposition of tailings currently limits dust generation from the TSF surface. The Radiation Management Plan and Radioactive Waste Management Plan contains mitigation strategies for electromagnetic radiation.	Slight	Rare	Low	The Delegated Officer considers the risk of dust increasing radionuclide concentrations is low as the nearest sensitive receptor is 15 km west of the premises. The proposed controls are sufficient for mitigating dust emissions. The Delegated Officer notes that radiation doses to personnel are regulated by DMIRS.	Nil
	Discharge to groundwater (seepage)	Change in radionuclide concentrations of tailings to the TSF pathway causing changes to groundwater quality, approximately 14 mbgl and on Banana Springs located 15 km from premises	As outlined above, seepage is mitigated by a double liner (300 mm of compacted soil and 1.5 mm HDPE) and an underdrainage collection and recovery system above the liner. The Radioactive Waste Management Plan will contain mitigation strategies for electromagnetic radiation.	Slight	Unlikely	Low	The Delegated Officer considers the risk of increased radionuclide concentrations in seepage from the TSF is low as the nearest sensitive receptor is 15 km west of the premises, the TSF is constructed using a double liner (300 mm of compacted soil and 1.5 mm HDPE) and an underdrainage collection and recovery system above the liner. The existing controls (compacted soil base, HDPE liner, underdrainage system, decant tower for removal of supernatant water, daily inspections, groundwater monitoring) are sufficient to continue mitigating emissions to water. The Delegated Officer notes that radiation doses to personnel is regulated by DMIRS.	Existing Condition 1.3.4, Table 1.3.3, containment infrastructure

7. Consultation

Method	Comments received	DWER response
Application advertised on DWER website (10/06/2016)	None received	N/A
DMIRS (26/07/2019)	Northern Minerals Limited submitted a Mining Proposal (Registration ID 80975) to DMIRS relating to M80/627 on 13 July 2019. DMIRS has no concerns about the proposed amendment to licence L9009/2016/1.	N/A
Request for further information (28/08/2019)	Further information regarding geotechnical characterisation of the process tailings supplied. Update on the status of the EPBC Act referral and the revision of the Radiation Management Plan via DMIRS.	Response acceptable
Review of draft revised Licence by applicant (14/02/2020)	Refer to Appendix 2	Refer to Appendix 2

8. Conclusion

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

Summary of amendments

The following table provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Condition No.	Proposed amendments
Condition 1.3.4, Table 1.3.3	Evaporation pond freeboard limit administrative change – Minimum freeboard of 300 mm below spillway invert maintained.
Condition 1.3.7, Table 1.3.4	Tailings and evaporation pond delivery pipeline modification to inspection frequency.
Condition 1.3.8	Category 5 premises production or design capacity limit increase to 131,490 tonnes per annual period.
Condition 1.3.9	Requirement to undertake a water balance for the TSF.
Condition 1.3.10	Construction of ore sorting circuit.
Condition 1.3.11	Operation of the ore sorter following submission of the compliance documents required under condition 3.3.1.
Condition 3.1.1	Maintain accurate and auditable books; added to contemporise the licence.
Condition 3.1.2	Information and records required; modified to contemporise the condition licence.

Condition No.	Proposed amendments
Condition 3.1.3	Removed as was duplication of condition of Condition 3.2.1.
Condition 3.1.4	Revised to become Condition 3.1.3 and updated to contemporise the licence.
Condition 3.2.1	Added the requirement for annual audits (to contemporise the condition).
Condition 3.2.1, Table 3.2.1	Added reporting of water balance in the AER.
Condition 3.2.2	Amended to contain monitoring reports (to contemporise the condition).
Condition 3.3.1, Table 3.3.1	Amended to contain a compliance document to the CEO, following the construction of the ore sorter.

Alana Kidd

MANAGER, RESOURCE INDUSTRIES

An officer delegated by the CEO under section 20 of the EP Act

Appendix 1: Key documents

	Document title	In text reference	Availability
1.	Licence (L9009/2016/1) amendment application form and supporting documentation (May, 2019)	L9009/2016/1	DWER record: A1789031
2.	Pilot Plant, Tailings Storage Facility and Evaporation Pond Operating Manual, prepared by Knight Piésold Consulting for Northern Minerals Limited, April 2018	Knight Piésold, 2018	DWER record: A1853110
3.	Supplementary information for licence amendment application (L9009/2016/1): Browns Range Project – Ore Sorter Tailings Sample Testing. Memo PE19-01176, prepared by Knight Piésold Consulting for Northern Minerals Limited, October 2019	Knight Piésold, 2019	DWER record: A1841281
4.	Browns Range Project – Updated Surface Water Management Plan (1667882-001-R-Rev0), prepared by Golder Associates for Northern Minerals Limited, January 2017	Golder Associates, 2017	DWER records: A1853106
5.	DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	DER, 2015a	accessed at www.dwer.wa.gov.au
6.	DER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.	DER, 2015b	
7.	DER, August 2016. <i>Guidance Statement: Licence duration</i> . Department of Environment Regulation, Perth.	DER, 2016a	
8.	DER, November 2016. <i>Guidance Statement: Environmental Siting</i> . Department of Environment Regulation, Perth.	DER, 2016b	
9.	DWER, February 2017. <i>Guidance Statement: Risk Assessments</i> . Department of Water and Environmental Regulation, Perth.	DWER, 2017b	
10.	DWER, June 2019 <i>Guidance Statement: Decision Making</i> . Department of Water and Environmental Regulation, Perth.	DWER, 2019a	
11.	DWER, June 2019. <i>Guideline: Industry Regulation Guide to Licensing</i> . Department of Water and Environmental Regulation, Perth.	DWER, 2019b	

Appendix 2: Summary of applicant's comments on draft conditions

Condition	Summary of Licence Holder comment	DWER response
Cover page	Heading on right hand column should be modified to read "Assessed design production capacity"	This clarification is acceptable and has been amended in the licence.
Page 3	Please change wording in the final sentence to read, "...or if it takes longer than expected to ramp the plant up to the design production capacity." The design capacity of the Browns Range plant is unchanged. According to DWER's Industry Regulation Guideline to Licensing (2019), 'production capacity' is "the rate at which a product is produced as relevant to the description of the prescribed premises category; and design capacity is the maximum capacity for which the facility or equipment is designed to receive, handle, process, contain or emit, as relevant to the description of the prescribed premises category..."	This clarification is acceptable and has been amended in the licence.
Page 4	Please change to, "The design production capacity has increased by virtue of the addition of an ore sorting circuit, as described in the following section." The design capacity of the Browns Range plant is unchanged.	This clarification is acceptable and has been amended in the licence.
Table 1.3.3	Change text from " Minimum top of spillway freeboard of 300-mm maintained " to "Maintain operational freeboard (vertical height between inside embankment crest and adjacent tailings level) of no less than 300 mm"	Amended to the following to improve clarity: • Maintain operational freeboard of no less than 300 mm
Condition 1.3.6 (a)	Please amend to read, "1.3.6 The licence holder shall ensure that all pipelines containing tailings, tailings return water and hydrometallurgical raffinate are either: (a) equipped with operating telemetry systems and pressure sensors to allow detection of leaks and failures; or"	This clarification is acceptable and has been amended in the licence.
Table 1.3.6	It is not clear to what the superscript '1' in the header refers. Suggest deletion.	This clarification is acceptable and has been amended in the licence.

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Table 1.3.6	Northern Minerals considers that the list of equipment set out in the column headed 'design and construction requirements' is not aligned with intention of Section 53 of the <i>Environmental Protection Act 1986</i> and is inconsistent with DWER's Industry Regulation Guideline to Licensing (2019) in that the installation and operation of most of the items listed would have no material effect on emissions from the premises, neither would the operation of the listed equipment materially alter the nature or volume of the waste, noise, odour or electromagnetic radiation emitted from the prescribed premises. We suggest the following revised text:	Comments as below.
	1. Crushed ore bin (1 x 20 m 3) fed directly from the existing primary crusher via crusher discharge conveyor. [Not relevant to emissions or wastes]	Capacity of the crushed ore bin has been removed from the condition. The deposition into the crushed ore bin has been considered in the risk assessment as a source of dust/noise emissions and spills, and therefore no other changes recommended.
	2. Stacker conveyor to transfer ore directly from the primary crusher to the bypass stockpile in the event the XRT ore sorter is offline. And to transfer sorted ore materials and sludge from the washing screen and clarifier to the bypass stockpile. [Not relevant to emissions or wastes]	No change is recommended. Conveyors can be a source of dust/noise emissions and spills.
	3. Classification screen to be fitted with, including dust suppression sprays to control dust generated from fines, at the point it discharges from the screen and travels via conveyor to the select stockpile.	No change is recommended. Conveyors can be a source of dust/noise emissions and spills.
	4. Stacker conveyor from the classification screen to the oversized stockpile for Oversized material to be recycled back through the existing crushing circuit.	No change is recommended. Conveyors can be a source of dust/noise emissions and spills.
	5. Washing screen (1 x 15 m 3) and clarifier to remove sludge fines (sludge co-deposited with sorted select material to the select stockpile for processing). [Not relevant to emissions or wastes]	Capacity of the washing screen wash water storage tank has been removed from the condition. The washing screen has been considered in the risk assessment as a mechanism for abating dust emissions, and therefore no other changes recommended.

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	6. Wash water storage tank (1 x 5 m ³). [Not relevant to emissions or wastes]	Capacity of the wash water storage tank has been removed from the condition. The wash water storage tank has been considered in the risk assessment as a potential source of emissions from tank ruptures or spills, and therefore no other changes recommended.
	7. Sorted ore reporting from the XRT ore sorter to report to the existing SAG mill feed bin.	Amended to the following to improve clarity: • XRT ore sorter to sort ore prior to reporting to the existing SAG mill feed bin.
	8. Conveyors to transport sorted and unsorted ore between each stage. [Not relevant to emissions or wastes]	No change recommended. Conveyors can be a source of dust/noise emissions and spills.
Table 3.3.1	Heading should be changed to 'Audit, Reporting and Notification Requirements' to more accurately reflect the content of the table.	No change is recommended as is not considered to affect the nature and intent of the contents of the table.
Table 3.3.1 – Notification requirement for condition 1.3.11	Suggest text should be revised as follows: • “The audit report must be certified by a suitably qualified professional engineer stating whether or not each item of infrastructure or component of infrastructure specified in Table 1.3.6 has been constructed, complies with the corresponding requirements in that table and contains no material defects or variations; • Where an item of infrastructure or component of infrastructure specified in Table 1.3.6 has not been constructed, does not comply with the corresponding requirements in that table or contains material defects or variations, describe the measures proposed to rectify the issue (s), together with timescales for implementing the proposed measures, or - where the variation provides equivalent or improved environmental outcomes - an explanation of the modified design and description of the as-built asset must be included in the audit report. • The audit report must be signed by a person authorised to represent the licence holder and contain the printed name and position of that person within the company.”	Addition of standard text into the licence regarding whether infrastructure has been built to specifications: • where an item of infrastructure has been certified as not being located or constructed, or does not comply with the corresponding requirements, the licence holder must correct the non-compliant or defective works, prior to re-certifying, or provide to the CEO a description of, and explanation for, any departures from the requirements specified in Table 1.3.6 that do not require relocation or rectification and do not constitute a material defect along with the report. A risk assessment has been undertaken for this licence amendment based on the information presented in the application, and has identified where regulatory controls are required in accordance with Guidance Statement: Risk Assessments https://www.der.wa.gov.au/images/documents/our-work/licences-and-works-approvals/GS_Risk_Assessments.pdf Any changes to a works approval or licence must be considered by the Licence Holder as per the <i>Guideline: Industry Regulation Guide to Licensing, June 2019</i> available on the Departments website at

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		https://www.der.wa.gov.au/our-work/licences-and-works-approvals/540-guideline-industry-regulation-guide-to-licensing . Where unsure whether an application for a licence amendment or a works approval is appropriate, the Licence Holder can discuss options with the Department.