

Summary of Environmental Monitoring

A monitoring and inspection summary are detailed in Table C-1. This relates to all existing monitoring and extends the programme to monitor potential impacts associated with this Proposal.

Table C-1: Monitoring and Inspections

Monitoring	Parameters/Type	Method	Frequency	Units	Status
Process Monitoring					
Evaporation Ponds	Volume of wastewater discharged to evaporation ponds	Not specified	Cumulative Monthly Total	m ³	Existing Regulated
Combined Wastewater	Volume used as dust suppressant	Not specified	Cumulative Monthly Total	m ³	Existing Regulated
	pH	AS/NZS 5667.10	Monthly	mg/L (apart from pH and unless otherwise stated)	Existing, Regulated
	TDS				
Process water discharge to evaporation ponds	Electrical Conductivity (mS/m) Total hardness (as CaCO ₃) Total alkalinity (as CaCO ₃) Metals (Al, As, Cd, Cr, Cu, Fe, Mn, Hg, Mb, Ni, Se, Sr, U, Tl, Th, Zn) Anions and cations (Ca, Mg, Na, K, carbonate, chloride, sulphate) Radionuclides (²²⁸ Ra, ²²⁶ Ra)	AS/NZS 5667.10	Quarterly	mg/L (unless otherwise stated)	Existing, Regulated
TSF1, TSF2, TSF3 RWP discharge to Evaporation Ponds	Volume discharged to <ul style="list-style-type: none"> • TSF1 • TSF2 • TSF3 	Not specified	Cumulative Monthly Total	m ³ (wet) DMT	Existing, Regulated, extend to TSF4
	SWL	Piezometers	Monthly	m AHD	Existing via TSF Operating Manual
	Global Geotechnical Stability of TSFs	Theodolite Prisms	Quarterly	mm	
By-product Landform	Tonnes of IP and Gypsum received from Kalgoorlie REPF	Not specified	Monthly	t	-

Monitoring	Parameters/Type	Method	Frequency	Units	Status
Monitoring of ambient groundwater quality					
Groundwater monitoring bores (LMW01-LMW16). New groundwater monitoring bores (LMW17 and LMW18) for by-product landform as regulated by DWER Part V.	Standing water level	MTW-EN-SOP-0013 TSF Piezometer Bore Monitoring	Monthly	mAHD (mbgl)	Existing, Regulated (LWM01- LWM16)
	pH Electrical Conductivity ($\mu\text{S/m}$) TDS	AS/NZS 5667.11 MTW-EN-PRO-0022 – Surface and Groundwater Monitoring Procedure (spot sample)	Quarterly	mg/L (apart from pH and unless otherwise stated)	Existing, Regulated (LWM01- LWM13)
	Total hardness (as CaCO_3) Total alkalinity (as CaCO_3)	AS/NZS 5667.11 MTW-EN-PRO-0022 – Surface and Groundwater Monitoring Procedure (spot sample)	Quarterly	mg/L (unless otherwise stated)	Existing, Regulated (LWM01- LWM16)
	Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Mn, Mb, Ni, Se, Sr, Tl, Th, U, Zn, Fe, soluble component only) Anions and cations (Ca, Mg, Na, K, carbonate, chloride, sulphate)	AS/NZS 5667.11 MTW-EN-PRO-0022 – Surface and Groundwater Monitoring Procedure (spot sample)	Quarterly	mg/L (unless otherwise stated)	Existing, Regulated (LWM01- LWM16)
Visual Inspections					
RWP, TSF1, TSF2 & TSF3, and all pipelines containing saline water or tailings	Visual inspections	MTW-PR-SOP-0015 – TSF and Evaporation Pond Inspection Procedure	At least daily	N/A	Existing, Regulated, extend to TSF4 and all proposed infrastructure

Monitoring	Parameters/Type	Method	Frequency	Units	Status
Erosion inspection	Visual inspections	MTW-PR-SOP-0015 – TSF and Evaporation Pond Inspection Procedure; MTW-EN-SOP-0003 – Surface Water Monitoring Inspection	Monthly	N/A	Existing, Regulated, extend to TSF4, by-product landform and all proposed infrastructure
Radiation* and Dust					
Radionuclides in groundwater, Supernatant and other site water	²²⁸ Ra ²²⁶ Ra	AS/NZS 5667.11 MTW-EN-PRO-0022 – Surface and Groundwater Monitoring Procedure (spot sample)	6 monthly	Bq/L	Existing, Regulated; extend to TSF4, by-product landform and all proposed infrastructure
External Radiation – gamma radiation	Surveys and measurements at mining pit or its boundary		Quarterly as a minimum Frequency increased if mining re-commences	Variable (μ Sv/h; mSv/yr)	Existing, Regulated; extend to TSF4, by-product landform and all proposed infrastructure
	Lanthanide ore storage area or its boundary				
	Waste landform or its boundary				
	Concentrator plant and surroundings		Quarterly as a minimum		
	Boundary of the tailings storage facility				
	Concentrate temporary storage areas				
	Every full-time employee who is expected to spend a significant proportion of their working time in radiation supervised area will wear a TLD badge				

Monitoring	Parameters/Type	Method	Frequency	Units	Status
Sitewide dust monitoring	10 personal dust samples per month		10 per month	µSv/h	Existing, Regulated
	Additional sampling to be carried out for employees <ul style="list-style-type: none"> during the crushing operations (10 personal samples per month) during mining operations (10 personal samples per month) 		10 per month	µSv/h	
	Positional (area) samples will be taken at the discretion of the site's ventilation officer		Variable	µSv/h	
	Four high volume samples collected from each identified location every quarter		Quarterly		
Radon and thoron – internal radiation exposure	Sampling for radon and thoron to be carried out in different site areas using electronic equipment as required and/or at the discretion of the site radiation safety officer		Variable	Bq/m ³	Existing, Regulated
	Further monitoring of internal exposure will be carried out when mining campaign occurs		Variable	Bq/m ³	
Surface contamination	10 measurements per quarter each from mobile equipment, light vehicles and from offices, crib room and the plant		Quarterly/ Variable	Bq/m ²	Existing, Regulated
	10 measurements per quarter from employees' clothing (a dedicated monitor is also available for workers to check the levels of surface contamination in accordance with the instructions issued by the radiation safety officer)		Quarterly/ Variable	Bq/m ²	Existing, Regulated
	Additional sampling to be carried out during crushing and mining operations, on average — 15 measurements per quarter at each area. All construction phase heavy mobile equipment to be checked before leaving site		Quarterly/ Variable	Bq/m ²	Existing, Regulated

Table Notes:

- * The Radiation Monitoring programme is a separate approvals document, and these conditions are an indication of typical monitoring programme. Due to the intermittent processing, mining and crushing campaigns this monitoring programme may be modified as agreed by the Radiation Safety Officer and the Surface Ventilation Officer.