

As part of this process of preparing the Closure and Reclamation Management Plan, KCGM in conjunction with Barrick and Newmont identified the risks posed through implementation of the existing closure strategy in order to ensure that these are appropriately mitigated.

The following assumptions were made during the risk assessment:

- Only plausible risks were considered;
- Risks were assessed on the basis of current control and risk mitigation measures;
- Focus on planned closure with risks determined after completion of closure; and
- Closure prescriptions based on those included in the current closure cost estimate.

The closure risk register developed for the KCGM operations is included below.

Site: KCGM			Focus of Risk Assessment : Mine Closure											Date: 6-8/5/2009								
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
U/G Mine	Geotechnical Instability	Subsidence and/or sinkhole development	Potential subsidence of stopes & old workings	Decommissioning	S	4	C	CE	B	H	5	Backfilling stopes and fencing of sinkholes as these appear	Decommissioning	P	4	U	HB	D	M	14	Accurate mapping of mined area & monitoring	Operational
			Potential subsidence zones not marked on landuse maps	Post Closure	S	4	O	CE	C	M	9	Backfilling stopes and areas mapped. Existing sinkholes fenced	Decommissioning	P	4	U	HB	D	M	14	Monitor performance and no development on land	10 years post closure
		Seismic activity	Underground mining	Post Closure	S	4	C	CE	B	H	5	Backfilling stopes and fencing of sinkholes as these appear	Decommissioning	P	4	U	HB	D	M	14	Accurate mapping of mined area & monitoring	Operational
	Public safety	Public access to workings resulting in injury or death	Areas not effectively fenced off	Decommissioning	S	5	C	CO	C	H	6	Access to mine area strictly controlled and existing sinkholes fenced	Decommissioning	P	5	U	HB	D	M	10	Periodic inspections of area and fences	Operational
			Areas not effectively sealed and fenced off	Post Closure	S	5	U	CE	D	M	10	Backfilling stopes and areas mapped. Existing sinkholes fenced	Decommissioning	P	5	U	HB	D	M	10	Periodic inspections of area and fences	Post closure
	Geochemical Instability	Contamination of groundwater resources	Rising groundwater levels and acid mine drainage	Post Closure	E	3	C	CE	B	H	8	Pit lake water quality model and prediction of post closure water quality	Operational	P	3	F	HB	C	M	13	Update pit lake model and monitor performance against model findings	10 years post closure
Inappropriate decommissioning	Loss of re-sale revenue	Poor closure planning	Post Closure	F	3	O	CE	C	M	13	Developing Closure Plan	Operational	P	3	O	HB	D	M	17	Monitor performance	At closure	

Site: KCGM			Focus of Risk Assessment : Mine Closure													Date: 6-8/5/2009						
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
Open cut mined areas	Geotechnical Instability	Collapse/slumping of pit walls	Unstable upper wall not battered to correct angle	Post Closure	L	4	U	CE	D	M	14	Geotechnical study & batter upper wall if necessary	Operational & decommissioning	P	3	U	CE	D	M	17	Monitor performance	10 years post closure
	Public safety	Public access to pit void resulting in injury or death	Areas not effectively bunded and fenced off	Post Closure	S	5	C	CE	B	H	3	Adequate abandonment bund & fence	Decommissioning	P	5	O	CO	D	M	10	Maintain fence and establish responsibility for maintenance post relinquishment	Post Closure
			Not having competent material available when required for abandonment bund	Decommissioning	P	3	U	CE	D	M	17	No existing controls			3	U	CE	D	M	17	Improve mine planning regarding waste rock management	Immediate
	Geochemical Instability	Contamination of groundwater resources	Rising groundwater levels and acid mine drainage (including metal mobilisation, salinity, CN)	Post Closure	E	3	C	EX	A	H	4	Pit lake water quality model and prediction of post closure water quality	Operational	P	1	C	EX	A	M	11	Update pit lake model and monitor performance against model findings	Operational & 10 years post closure
			Risk to flora and fauna	Pit lake has poor water quality, open water in arid areas attract water birds	Post Closure	E	1	C	CE	B	M	15	Predicted depth of pit lake makes it inaccessible to most animals except birds	Closure	P	1	F	HB	C	M	18	Report regarding attractiveness of pit to birds and risks from predicted water quality

Site: KCGM			Focus of Risk Assessment : Mine Closure										Date: 6-8/5/2009									
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
Process Plant & Logistical Support areas	Contamination	Soil and groundwater contamination	Ineffective contaminated site clean up and audit	Post Closure	E	3	F	CE	B	H	8	Potentially contaminated site identified and reported to DEC	Operational	P	3	F	HB	C	M	13	Conduct audit and monitor performance of remediated areas	Post decommissioning & 10 years post closure
	Safety	Injury during demolition	Ineffective safety plan	Decommissioning	S	5	F	CE	B	H	3	Decommissioning Plan to be developed	Prior to decommissioning	P	5	O	CO	D	M	10	Strict implementation of Decommissioning plan	Decommissioning
		Exposure to contaminants	Use of cyanide and other chemicals, Hg in ore	Decommissioning	S	5	F	CE	B	H	3	Decommissioning Plan to be developed. To include requirements of existing Decommissioning Plan for Cyanide Facilities	Prior to decommissioning	P	5	O	CE	C	H	6		
		Falling into unmarked holes etc	Unfilled underground chambers	Decommissioning	S	5	C	CO	C	H	6	No existing controls			5	C	CO	C	H	6	Survey and include in Decommissioning Plan	Prior to decommissioning
	Poor vegetation cover	Non relinquishment due to unacceptable aesthetics	Insufficient/inappropriate cover (re-growth) material	Post Closure	E	1	C	CE	B	M	15	Developing Closure Plan and undertaking materials characterisation	Operational	P	1	C	HB	B	M	15	Monitor performance	10 years post closure
	Lost opportunity for residual gold	Lost revenue	Gold in underlying soil, low grade stockpiles left unprocessed	Decommissioning	P	4	U	EX	D	M	14	Treatment of low grade stockpiles included in Life of Mine Plan	Operational	P	3	U	EX	D	M	17	Develop plan for post closure sampling and treatment of gold sinks (include in Decommissioning Plan)	Prior to decommissioning

Site: KCGM					Focus of Risk Assessment : Mine Closure										Date: 6-8/5/2009							
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
Infrastructure	Contamination	Soil and groundwater contamination	Ineffective contaminated soil clean up and audit	Post Closure	E	3	F	CE	B	H	8	Potentially contaminated site identified and reported to DEC	Operational	P	3	F	HB	C	M	13	Conduct audit and monitor performance of remediated areas	Post decommissioning & 10 years post closure
		Exposure to contaminants	PCBs in transformers	Decommissioning	E	2	U	CE	D	L	22	Decommissioning Plan to be developed	Prior to decommissioning	P	2	U	CE	D	L	22		
	Safety	Injury during demolition	Ineffective safety plan	Decommissioning	S	5	C	CE	B	H	3	Decommissioning Plan to be developed	Prior to decommissioning	P	5	O	CO	D	M	10	Strict implementation of Decommissioning plan	Decommissioning
	Poor vegetation cover	Non relinquishment due to unacceptable aesthetics	Insufficient/inappropriate cover (re-growth) material	Post Closure	E	1	C	CE	B	M	15	Developing Closure Plan	Prior to decommissioning	P	1	C	HB	B	M	15	Monitor performance	10 years post closure
	Equipment etc stolen during decommissioning	Unacceptable access to site	Lowered level of security after closure	Decommissioning	P	3	C	EX	A	H	4	No existing controls			3	C	EX	A	H	4	Include security in Decommissioning Plan	Prior to decommissioning

Site: KCGM			Focus of Risk Assessment : Mine Closure										Date: 6-8/5/2009									
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
Waste rock landforms	Contaminant Exposure	ARD to local surface water drainage	Rainfall infiltration through dumps with PAF material (shales). Limited waste rock characterisation data	Post Closure	E	3	C	CE	B	H	8	Guideline that shales not dumped within 50m of external face of landform	Operational	L	3	C	HB	B	H	8	Additional waste characterisation, identify where shale on outer batters & reinforce management of encapsulation	Immediate
	Contaminant Seepage	Contamination to local groundwater below Oroya	Encapsulated Oroya, Balgodd and Galconda TSFs	Operational	E	3	C	EX	A	H	4	Awareness of issue, groundwater monitoring in area	Operational	L	3	C	HB	B	H	8	Investigate extent of local groundwater contaminant plume and develop action plan if required	Operational & for 10 years post closure
	Geotechnical Instability	Erosion and sedimentation	In appropriate cover and drainage design	Post Closure	E	3	F	EX	B	H	8	Oxide cover on 18 to 20 degree slope with contour ripping	Operational	L	3	F	EX	B	H	8	Establish effective cover & drainage design, construct a sediment bund at toe of landforms	Immediate
		Need to re-work existing rehabilitated areas	In appropriate cover and drainage design	Operational	E	3	F	CE	B	H	8	Oxide cover on 18 to 20 degree slope with contour ripping	Operational	L	3	F	CE	B	H	8	Establish effective cover & drainage design	Immediate
		Public safety - injury	Slopes too steep or deep uncontrolled gully formation	Post Closure	S	2	F	CO	C	M	16	Oxide cover on 18 to 20 degree slope with contour ripping	Operational	L	1	F	HB	C	M	18	Establish effective cover & drainage design	Immediate
	Hydrological Instability	Erosion and sedimentation	Inappropriate drainage design resulting in overtopping crest bund	Post Closure	E	3	O	EX	C	M	13	Oxide cover on 18 to 20 degree slope with contour ripping	Operational	L	2	O	EX	C	M	16	Establish effective drainage design	Immediate
	Poor vegetation cover	Dust issue in Kalgoorlie	Dominant wind direction towards Kalgoorlie	Operational	C	3	F	EX	B	H	8	Oxide cover on 18 to 20 degree slope with contour ripping	Operational	L	3	F	EX	B	H	8	Establish effective cover design	Immediate
		Unacceptable aesthetics	Lack of appropriate growth medium on batters	Operational	C	3	C	EX	A	H	4	Oxide cover on 18 to 20 degree slope with contour ripping	Operational	L	3	C	EX	A	H	4	Establish effective cover design	Immediate
		Erosion and sedimentation	Lack of appropriate growth medium on batters	Operational	E	3	F	EX	A	H	4	Oxide cover on 18 to 20 degree slope with contour ripping	Operational	L	3	F	EX	B	H	8	Establish effective cover design	Immediate

Site: KCGM			Focus of Risk Assessment : Mine Closure											Date: 6-8/5/2009									
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action		
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)	
FIMISTON OPERATIONS																							
Waste rock landforms	Failure of Closure Plan for waste rock landform	Non-relinquishment or re-working of rehabilitated areas	Lack of information surrounding physical/chemical characteristics & volumes of waste and rehabilitation materials. High visibility from town.	Post Closure	P	5	C	EX	A	H	1	No existing controls				5	C	EX	A	H	1	Materials characterisation, materials inventory, rehabilitation prescriptions, drainage design, landform design.	Immediate
	Inappropriate closure design	Failure achieving relinquishment	Batters too steep and lack of appropriate rock armour and growth medium on batters	Post Closure	F	4	F	EX	B	H	5	Oxide cover on 18 to 20 degree slope with contour ripping	Operational	L	4	O	CE	C	M	9	Establish effective cover design	Immediate	

Site: KCGM					Focus of Risk Assessment : Mine Closure										Date: 6-8/5/2009								
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action		
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)	
FIMISTON OPERATIONS																							
Tailings Storage Facilities	Contaminant Exposure	ARD to local surface water drainage	Rainfall washoff within gullies on outer batters	Post Closure	E	4	C	EX	A	H	2	Rock armour & oxide cover	Decommissioning	P	4	C	HB	B	H	5	Establish effective cover & drainage design	Operational	
	Excessive Seepage	Groundwater contamination plumes moves beyond TSF footprint	Excessive infiltration through TSF post closure	Post Closure	E	4	C	EX	A	H	2	Recovery bores and pumping, groundwater monitoring and quarterly reporting to DEC and DoW	Operational	P	4	O	HB	D	M	14	Establish effective cover & drainage design	Operational	
		Die off of local vegetation and or seepage discharge	Uncontrolled rising groundwater mound	Post Closure	E	3	C	EX	A	H	4	Recovery bores and pumping, groundwater monitoring and quarterly reporting to DEC and DoW	Operational	P	3	O	HB	D	M	17	Establish effective cover & drainage design	Operational	
		Die off of local vegetation on adjacent property	Uncontrolled rising groundwater mound	Post Closure	C	3	C	EX	A	H	4	Recovery bores and pumping, groundwater monitoring and quarterly reporting to DEC and DoW	Operational	P	3	O	HB	D	M	17	Investigate extent of local groundwater contaminant plume and monitor movement	Immediate & for 10 yrs post closure	
	Long-term seepage from TSF	Requirement to pump (and possibly treat) for extended period of time post closure	Lack of studies on time required for pumping seepage back	Post Closure	P	4	C	HB	B	H	5	No existing controls				4	C	HB	B	H	5	Investigate predicted post-closure pumping period.	Immediate
	Cannot get agreement on post-closure groundwater levels or groundwater levels cannot be achieved	Requirement to pump (and possibly treat) for extended period of time post closure. Unable to relinquish leases or reduce bond.	Lack on information, possibility of Government changing goal posts re water levels.	Post Closure	P	3	O	HB	D	M	17	Current groundwater model approved by DoW and historic water levels agreed on.	Operational	L	3	U	HB	D	M	17	Include post-closure groundwater levels in Closure Plan and include in discussions with Government. Investigate time required to reach baseline water levels post-closure.	Operational	
	Plan to dispose of TSF seepage water into pit post-closure not acceptable	Requirement to treat seepage for alternative disposal option	Unsure of requirements of International Cyanide code	Post Closure	P	4	C	CE	B	H	5	No existing controls				4	C	CE	B	H	5	Investigate Cyanide code requirements and investigate alternatives to disposal of water into Fimiston pit	Operational

Site: KCGM			Focus of Risk Assessment : Mine Closure													Date: 6-8/5/2009						
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
Tailings Storage Facilities	Geotechnical Instability	Erosion and sedimentation	Inappropriate cover and drainage design	Post Closure	E	4	C	EX	A	H	2	Rock armour & oxide cover	Decommissioning	L	4	F	CE	B	H	5	Establish effective cover & drainage design	Operational
		Need to re-work existing rehabilitated areas	Inappropriate cover and drainage design	Operational	E	4	C	EX	A	H	2	Rock armour & oxide cover	Decommissioning	L	4	F	CE	B	H	5	Establish effective cover & drainage design	Operational
		Damage to neighbouring rail or road services	Inappropriate cover and drainage design resulting in slope failure	Post Closure	F	4	C	HB	B	H	5	Rock armour & oxide cover	Decommissioning	L	4	F	HB	C	M	9	Establish effective cover & drainage design	Operational
		Public safety - injury	Slopes too steep or deep uncontrolled gully formation	Post Closure	S	3	O	HB	D	M	17	Rock armour & oxide cover	Decommissioning	P	2	O	HB	D	L	22	Establish effective cover & drainage design & restrict access by fencing	Closure
	Hydrological Instability	Erosion and sedimentation	Inappropriate drainage design resulting in overtopping crest bund	Post Closure	E	4	F	CE	B	H	5	Rock armour & oxide cover	Decommissioning	P	4	F	CE	B	H	5	Establish effective cover & drainage design	Operational
	Poor vegetation cover	Dust issue in Kalgoorlie	Dominant wind direction towards Kalgoorlie	Operational	C	3	C	CE	B	H	8	Rock armour & oxide cover	Decommissioning	P	3	C	HB	B	H	8	Establish effective cover design	Operational
		Unacceptable aesthetics	Lack of appropriate growth medium on batters	Operational	C	3	C	EX	A	H	4	Rock armour & oxide cover	Decommissioning	P	3	C	EX	A	H	4	Establish effective cover design	Operational
		Erosion and sedimentation	Lack of appropriate growth medium on batters	Operational	E	3	F	EX	B	H	8	Rock armour & oxide cover	Decommissioning	P	3	F	CE	B	H	8	Establish effective cover design	Operational
	Inappropriate closure design	Failure achieving relinquishment	Batters too steep and lack of appropriate rock armour and growth medium on batters	Post Closure	F	4	C	EX	A	H	2	Developing Closure Plan	Operational	P	4	O	CE	C	M	9	Establish effective cover & drainage design	Operational
			Restricted access for rock haulage due to rail and public road weight restrictions	Decommissioning	F	4	C	EX	A	H	2	Developing Closure Plan	Operational	P	4	O	HB	D	M	14	Review closure provision	Immediate

Site: KCGM		Focus of Risk Assessment : Mine Closure												Date: 6-8/5/2009								
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
Tailings Storage Facilities	Final surface inadequate for closure	Poor consolidation	Lack of information surrounding physical/chemical characteristics, volumes and locations of possible capping materials.	Decommissioning	P	5	C	EX	A	H	1	Have information on tailings characteristics.	Operational	L	5	C	EX	A	H	1	Materials characterisation, materials inventory, rehabilitation prescriptions, drainage design, landform design.	Immediate
			Poor operation of tailings dam near closure	Operational	P	4	O	EX	C	M	9	Tailings deposition management strategy and annual audit by tailings engineer	Operational	L	4	O	CE	C	M	9	Tailings deposition closure strategy	Operational

Site: KCGM				Focus of Risk Assessment : Mine Closure											Date: 6-8/5/2009							
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
Morrison's Flats	Contamination	Local surface and groundwater contamination	Tailings material remains spread over a large area that constitutes a local surface drainage	Post Closure	E	4	C	EX	A	H	2	Remove material & seed	Operational	P	3	F	HB	C	M	13	Do as soon as possible to provide adequate monitoring time	Immediate
	Poor vegetation cover	Dust issue in Kalgoorlie	Lack of appropriate cover material & re-growth media	Post Closure	C	3	C	EX	A	H	4	Remove material & seed	Operational	P	3	F	HB	C	M	13	Monitor performance	10 years post closure
		Unacceptable aesthetics		Post Closure	C	3	C	EX	A	H	4	Remove material & seed	Operational	P	3	F	HB	C	M	13	Monitor performance	10 years post closure
	Inappropriate closure implementation	Unnecessary closure costs	Inappropriate closure planning	Decommissioning	F	3	C	EX	A	H	4	Rehabilitation continually postponed	Operational	P	3	O	CE	C	M	13	Implement rehabilitation plan in timely fashion	Immediate
		Failure achieving Relinquishment	Unsuccessful contaminant cleanup	Post Closure	R	3	F	CE	B	H	8	Remove material & seed	Decommissioning	P	3	O	HB	D	M	17	Monitor performance	10 years post closure

Site: KCGM		Focus of Risk Assessment : Mine Closure															Date: 6-8/5/2009					
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
Recovery Borefield	Ineffective decommissioning	Non compliance with licence conditions	Uncapped bores & non rehabilitated pump sites & pipe lines	Post Closure	L	2	O	CE	C	M	16	Developing Closure Plan	Decommissioning	P	2	O	CO	D	L	22		
	Spillage	Die off of local vegetation	Breakage along pipeline and discharge of hypersaline water to environment	Post Closure	E	3	C	CE	B	H	8	Bunding in place with catch pits	Post Closure	P	3	O	HB	D	M	17		

Site: KCGM		Focus of Risk Assessment : Mine Closure														Date: 6-8/5/2009						
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
FIMISTON OPERATIONS																						
Exploration leases	Ineffective decommissioning	Non compliance with licence conditions	Un-capped bores & non rehabilitated drill sites	Post Closure	L	2	O	CE	C	M	16	Rehabilitated by Geology Department	Operational	P	2	O	CO	D	L	22	Audit rehabilitation program	Closure
	Safety	Injury to domestic animals	Animals stepping in open holes and on metal pegs/stakes	Post Closure	R	1	U	HB	D	L	23	Rehabilitated by Geology Department	Operational	P	1	U	CO	E	L	25	Audit rehabilitation program	Closure

Site: KCGM			Focus of Risk Assessment : Mine Closure										Date: 6-8/5/2009									
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
MT CHARLOTTE																						
U/G Mine	Geotechnical Instability	Subsidence and/or sinkhole development	Potential subsidence zones not marked on landuse maps	Post Closure	S	4	O	CE	C	M	9	Backfilling stopes and areas mapped. Existing sinkholes fenced	Operational	P	4	U	HB	D	M	14	Monitor performance	10 years post closure
		Ongoing seismic activity	Geotechnical instability of pillars and crowns	Post Closure	S	3	C	CO	C	M	13	Void backfilling program currently in place. Review of geotechnical stability. Backfilling of any identified voids.	Operational	P	2	C	VD	D	L	22		
	Public safety	Public access to workings resulting in injury or death	Areas not effectively sealed and fenced off	Post closure	S	5	U	CE	D	M	10	Backfilling stopes and areas mapped. Existing sinkholes fenced	Decommissioning	P	5	U	HB	D	M	10	Maintain fence and security until all stopes backfilled	10 years post closure
	Geochemical Instability	Contamination of groundwater resources	Rising groundwater levels and acid mine drainage	Post closure	E	3	C	CE	B	H	8	Model of groundwater recovery	Operational	P	3	O	CE	C	M	13	Monitor performance over 1 year to track against model prediction	1 year post closure
	Inappropriate decommissioning	Loss of re-sale revenue	Poor closure planning	Post Closure	F	3	O	CE	C	M	13	Developing Closure Plan	Operational	P	3	O	HB	D	M	17	Monitor performance	Closure

Site: KCGM					Focus of Risk Assessment : Mine Closure										Date: 6-8/5/2009								
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action		
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)	
MT CHARLOTTE																							
Open cut mined areas	Geotechnical Instability	Collapse/slumping of pit walls	Backfilling not completed or adequate	Post Closure	L	4	C	CE	B	H	5	Backfilling included in Closure Plan	Operational	P	4	C	HB	B	H	5	Investigate depth of backfill required for geotechnical stability	Immediate	
	Public safety	Public access to pit void resulting in injury or death	Area within metres of public road	Operational	S	5	C	HB	B	H	3	Backfilling of pit & fenced	Decommissioning	P	5	F	CO	C	H	6	Maintain fence and restricted access	Post closure	
	Dust	Unacceptable dust generation from backfilled pit	Insufficient/inappropriate cover (re-growth) material and unable to access backfilled area for safety reasons	Post Closure	C	3	F	CE	B	H	8	No existing controls				3	F	CE	B	H	8	Monitor performance	Post closure
	Geochemical Instability	Contamination of groundwater resources	Rising groundwater levels and acid mine drainage	Post Closure	E	3	C	EX	A	H	4	Model of groundwater recovery	Operational	P	1	C	EX	A	M	11	Monitor performance to track against model prediction	1 year post closure	

Site: KCGM					Focus of Risk Assessment : Mine Closure										Date: 6-8/5/2009							
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
MT CHARLOTTE																						
Infrastructure	Contamination	Soil and groundwater contamination	Ineffective contaminated soil clean up and audit	Post Closure	E	3	F	CE	B	H	8	Potentially contaminated sites identified and reported to DEC	Decommissioning	P	3	F	HB	C	M	13	Conduct audit and monitor performance of remediated areas	Post decommissioning & 10 years post closure
	Safety	Injury during demolition	Ineffective safety plan	Decommissioning	S	5	O	CE	C	H	6	Decommissioning Plan to be developed	Decommissioning	P	5	O	CO	D	M	10	Strict implementation of Decommissioning plan	At decommissioning
		Public access to Cassidy headframe (if retained) resulting in injury or death	Area within metres of public road	Post Closure	S	5	C	HB	B	H	3	Site fencing to be maintained post closure to limit public access. Headframe will only be retained if post closure liability agreed upon in writing. Removal of access methods from ground surface.	Decommissioning	P	5	F	CO	C	H	6	Maintain fence and restricted access	Post closure
	Equipment etc stolen during decommissioning	Unacceptable access to site	Lowered level of security after closure	Decommissioning	P	3	C	EX	A	H	4	No existing controls			3	C	EX	A	H	4	Include security in Decommissioning Plan	Prior to decommissioning
	Poor vegetation cover	Non relinquishment due to unacceptable aesthetics	Insufficient/inappropriate cover (re-growth) material	Post Closure	E	1	C	CE	B	M	15	Developing Closure Plan	Operational	P	1	C	HB	B	M	15	Monitor performance	10 years post closure

Site: KCGM		Focus of Risk Assessment : Mine Closure														Date: 6-8/5/2009						
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
MT PERCY																						
Open cut mined areas	Geotechnical Instability	Collapse/slumping of pit walls	Unstable upper wall not battered to correct angle	Post Closure	L	5	O	HB	D	M	10	Construction of abandonment bund	Decommissioning	P	5	O	CO	D	M	10	Audit existing abandonment bunds against DMP guidelines and undertake geotechnical review of pits.	Immediate
		Damage to neighbouring rail or road services	Unstable upper wall not battered to correct angle and proximity to rail line and public road	Post Closure	L	5	O	HB	D	M	10	Construction of abandonment bund	Decommissioning	P	5	O	CO	D	M	10	Audit existing abandonment bunds against DMP guidelines and undertake geotechnical review of pits.	Immediate
		Sinkholes developing in backfilled portion of pit	Slumping & sinkholes developing in backfilled portion of Sir John Pit	Post Closure	S	5	C	EX	A	H	1	Geotechnical review, repairs & abandonment bund	Decommissioning	P	5	C	HB	B	H	3	Undertake geotechnical review, & repairs ASAP to allow for further settling and stabilisation of backfill while public access is still fully controlled	Immediate
	Public safety	Public access to pit void resulting in injury or death	Areas not effectively bunded and fenced off - proximity too public road	Operational	S	5	C	HB	B	H	3	Abandonment bund	Decommissioning	P	5	F	CO	C	H	6	Backfill over tailings & rubbish	Priority rehabilitation area
	Aesthetics	Unacceptable aesthetics of Sir John pit filled with tailings and rubbish	Exposed tailings material, tyres, piping and general rubbish	Post Closure	C	2	C	EX	A	H	7	Limited repair works	Decommissioning	P	2	C	CO	C	M	16	Backfill over tailings to limit oxygen ingress	Priority rehabilitation area
	Geochemical Instability	Contamination of groundwater resources	Rising groundwater levels and acid mine drainage	Post Closure	E	3	C	EX	A	H	4	No existing controls			3	C	EX	A	H	4		

Site: KCGM					Focus of Risk Assessment : Mine Closure											Date: 6-8/5/2009							
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action		
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)	
MT PERCY																							
Waste Rock Landforms	Geotechnical Instability	Erosion and sedimentation	In appropriate cover and drainage design	Post Closure	E	3	F	EX	B	H	8	Application of oxide and contour ripping, annual EFA monitoring	Decommissioning	P	3	F	HB	C	M	13	Review cover & drainage design	Priority rehabilitation area	
	Hydrological Instability	Erosion and sedimentation	Inappropriate drainage design resulting in overtopping of crest bund	Post Closure	E	3	F	EX	B	H	8	Application of oxide and contour ripping, annual EFA monitoring	Decommissioning	P	3	F	HB	C	M	13	Review cover & drainage design	Priority rehabilitation area	
	Poor vegetation cover	Dust issue in Kalgoorlie	Lack of appropriate growth medium on batters	Lack of appropriate growth medium on batters	Post Closure	C	3	F	CE	B	H	8	Application of oxide and contour ripping, annual EFA monitoring	Decommissioning	P	3	F	HB	C	M	13	Review cover design	Priority rehabilitation area
		Unacceptable aesthetics	Lack of appropriate growth medium on batters	Lack of appropriate growth medium on batters	Post Closure	C	2	C	EX	A	H	7	Application of oxide and contour ripping, annual EFA monitoring	Decommissioning	P	2	C	HB	B	M	12	Review cover design	Priority rehabilitation area
		Erosion and sedimentation	Lack of appropriate growth medium on batters	Lack of appropriate growth medium on batters	Post Closure	E	3	F	EX	B	H	8	Application of oxide and contour ripping, annual EFA monitoring	Decommissioning	P	3	F	HB	C	M	13	Review cover design	Priority rehabilitation area
	Inappropriate closure design	Failure achieving Relinquishment	Batters too steep and lack of appropriate rock armour and growth medium on batters	Batters too steep and lack of appropriate rock armour and growth medium on batters	Post Closure	F	4	O	EX	C	M	9	Application of oxide and contour ripping, annual EFA monitoring	Decommissioning	P	4	O	HB	D	M	14	Review cover & drainage design	Priority rehabilitation area

Site: KCGM					Focus of Risk Assessment : Mine Closure													Date: 6-8/5/2009				
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
MT PERCY																						
Tailings Storage Facilities	Contaminant Exposure	ARD to local surface water drainage	Rainfall washoff within gullies on outer batters	Post Closure	E	4	C	EX	A	H	2	Oxide cover and ripping, rock lined drop structures	Decommissioning	P	4	C	HB	B	H	5	Establish effective cover & drainage design	Priority rehabilitation area
	Excessive Seepage	Groundwater contamination plumes moves beyond TSF footprint	Excessive infiltration through TSF post closure	Post Closure	E	4	C	EX	A	H	2	Oxide cover and some vegetation growth, groundwater monitoring	Decommissioning	P	4	O	HB	D	M	14	Establish effective cover & drainage design	Priority rehabilitation area
		Die off of local vegetation and or seepage discharge	Uncontrolled rising groundwater mound	Post Closure	E	3	C	EX	A	H	4	Oxide cover and some vegetation growth, groundwater monitoring	Decommissioning	P	3	O	HB	D	M	17	Establish effective cover & drainage design	Priority rehabilitation area
	Geotechnical Instability	Erosion and sedimentation	In appropriate cover and drainage design on upper lift & north batters	Post Closure	E	4	C	EX	A	H	2	Oxide cover and ripping, rock lined drop structures	Decommissioning	L	4	F	CE	B	H	5	Establish effective cover & drainage design	Priority rehabilitation area
		Public safety - injury	Slopes too steep or deep uncontrolled gully formation	Post Closure	S	3	O	HB	D	M	17	Oxide cover and ripping, rock lined drop structures	Decommissioning	P	2	O	HB	D	L	22	Establish effective cover & drainage design & fence	Priority rehabilitation area
	Hydrological Instability	Erosion and sedimentation	Inappropriate drainage design resulting in overtopping crest bund	Post Closure	E	4	F	CE	B	H	5	Oxide cover and some vegetation growth, crest bund in place	Decommissioning	P	4	F	HB	C	M	9	Establish effective cover & drainage design	Priority rehabilitation area
	Poor vegetation cover	Dust issue in Kalgoorlie or Ninga Mia	Dominant wind direction towards Kalgoorlie	Operational	C	3	C	CE	B	H	8	Oxide cover	Decommissioning	P	3	C	HB	B	H	8	Establish effective cover design	Priority rehabilitation area
		Unacceptable aesthetics	Lack of appropriate growth medium on upper lift & north batters	Operational	C	3	C	EX	A	H	4	Oxide cover	Decommissioning	P	3	C	HB	B	H	8	Establish effective cover design	Priority rehabilitation area
		Erosion and sedimentation	Lack of appropriate growth medium on upper lift & north batters	Operational	E	3	F	EX	B	H	8	Oxide cover	Decommissioning	L	3	F	CE	B	H	8	Establish effective cover design	Priority rehabilitation area

Site: KCGM		Focus of Risk Assessment : Mine Closure													Date: 6-8/5/2009							
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
MT PERCY																						
Tailings Storage Facilities	Inappropriate closure design	Failure achieving Relinquishment	Batters too steep and lack of appropriate rock armour and growth medium on batters	Post Closure	F	4	C	EX	A	H	2	Developing Closure Plan	Post Closure	P	4	O	CE	C	M	9	Establish effective cover & drainage design	Priority rehabilitation area

Site: KCGM					Focus of Risk Assessment : Mine Closure										Date: 6-8/5/2009							
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
GIDJI ROASTER																						
Roaster and logistical support area	Contamination	Soil and groundwater contamination	Ineffective contaminated soil clean up and audit	Post Closure	E	3	F	CE	B	H	8	Potentially contaminated sites identified and reported to DEC	Decommissioning	P	3	F	HB	C	M	13	Conduct audit and monitor performance of remediated areas	Post decommissioning & 10 years post closure
	Poor vegetation cover	Non relinquishment due to unacceptable aesthetics	Insufficient/inappropriate cover (re-growth) material	Post Closure	E	1	C	CE	B	M	15	Developing Closure Plan	Operational	P	1	C	HB	B	M	15	Monitor performance	10 years post closure
	Contaminated seepage	Groundwater contamination	Undetected leakage from lined water and slurry ponds	Operational	E	3	C	HB	B	H	8	Groundwater monitoring	Decommissioning	P	3	F	CO	C	M	13	Monitor performance	10 years post closure

Site: KCGM					Focus of Risk Assessment : Mine Closure											Date: 6-8/5/2009						
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
GIDJI ROASTER																						
Tailings Storage Facilities	Contaminant Exposure	Contamination to local surface water drainage	Rainfall washoff within gullies on outer batters	Post Closure	E	4	C	EX	A	H	2	Toe drain currently in place around TSF, rock armour and topsoil cover	Operational	P	4	C	HB	B	H	5	Establish effective cover & drainage design	Operational
	Excessive Seepage	Groundwater contamination plumes moves beyond TSF footprint	Excessive infiltration through TSF post closure	Post Closure	E	4	C	EX	A	H	2	Recovery bores and pumping, groundwater monitoring and quarterly reporting to DEC and DoW	Decommissioning	P	4	O	HB	D	M	14	Establish effective cover & drainage design	Operational
		Die off of local vegetation and or seepage discharge	Uncontrolled rising groundwater mound	Post Closure	E	3	C	EX	A	H	4	Recovery bores and pumping, groundwater monitoring and quarterly reporting to DEC and DoW	Decommissioning	P	3	O	HB	D	M	17	Establish effective cover & drainage design	Operational
	Long-term seepage from TSF	Requirement to pump (and possibly treat) for extended period of time post closure	Lack of studies on time required for pumping seepage back	Post Closure	P	4	C	HB	B	H	5	No existing controls			4	C	HB	B	H	5	Investigate predicted post-closure pumping period.	Immediate
	Cannot get agreement on post-closure groundwater levels or groundwater levels cannot be achieved	Requirement to pump (and possibly treat) for extended period of time post closure. Unable to relinquish leases or reduce bond.	Lack on information, possibility of Government changing goal posts re water levels.	Post Closure	P	3	O	HB	D	M	17	No existing controls			3	O	HB	D	M	17	Include post-closure groundwater levels in Closure Plan and include in discussions with Government. Investigate time required to reach baseline water levels post-closure.	Operational
	Hydrological Instability	Erosion and sedimentation	Inappropriate drainage design resulting in overtopping crest bund	Post Closure	E	4	F	CE	B	H	5	Rock armour & topsoil cover	Decommissioning	P	4	F	CE	B	H	5	Establish effective cover & drainage design	Closure

Site: KCGM	Focus of Risk Assessment : Mine Closure	Date: 6-8/5/2009
-------------------	--	-------------------------

Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)

GIDJI ROASTER

Tailings Storage Facilities	Poor vegetation cover	Dust issue	Dominant wind direction towards Kalgoorlie	Operational	C	2	C	CE	B	M	12	Rock armour & topsoil cover	Decommissioning	P	2	C	HB	B	M	12	Establish effective cover & drainage design, determine characteristics of stockpiled topsoil	Closure
		Unacceptable aesthetics	Lack of appropriate growth medium on batters	Operational	C	3	C	EX	A	H	4	Rock armour & topsoil cover	Decommissioning	P	3	C	EX	A	H	4	Establish effective cover & drainage design, determine characteristics of stockpiled topsoil	Closure
		Erosion and sedimentation	Lack of appropriate growth medium on batters	Operational	E	3	F	EX	B	H	8	Rock armour & topsoil cover	Decommissioning	P	3	F	CE	B	H	8	Establish effective cover & drainage design, determine characteristics of stockpiled topsoil	Closure
	Final surface inadequate for closure	Poor consolidation	Lack of information surrounding physical/chemical characteristics, volumes and locations of possible capping materials.	Decommissioning	P	5	C	EX	A	H	1	Have information on tailings characteristics.	Operational	L	5	C	EX	A	H	1	Materials characterisation, materials inventory, rehabilitation prescriptions, drainage design, landform design.	Immediate
			Poor operation of tailings dam near closure	Operational	P	4	O	EX	C	M	9	Tailings deposition management strategy and annual audit by tailings engineer	Operational	L	4	O	CE	C	M	9	Tailings deposition closure strategy	Operational
	Inappropriate closure design	Failure achieving Relinquishment	Batters too steep and lack of appropriate rock armour and growth medium on batters	Post Closure	F	4	C	EX	A	H	2	Developing Closure Plan	Post Closure	P	4	O	CE	C	M	9	Establish effective cover & drainage design	Operational

Site: KCGM				Focus of Risk Assessment : Mine Closure										Date: 6-8/5/2009								
Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk					Existing Controls			Residual Risk					Recommended Action			
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)
GIDJI ROASTER																						
Infrastructure	Contamination	Soil and groundwater contamination	Ineffective contaminated soil clean up and audit	Post Closure	E	3	F	CE	B	H	8	Potentially contaminated sites identified and reported to DEC	Decommissioning	P	3	F	HB	C	M	13	Conduct audit and monitor performance of remediated areas	Post decommissioning & 10 years post closure
	Safety	Injury during demolition	Ineffective safety plan	Decommissioning	S	2	O	CE	C	M	16	Decommissioning Plan to be developed	Decommissioning	P	2	O	CO	D	L	22	Strict implementation of Decommissioning plan	At decommissioning
	Poor vegetation cover	Non relinquishment due to unacceptable aesthetics	Insufficient/inappropriate cover (re-growth) material	Post Closure	E	1	C	CE	B	M	15	Developing Closure Plan and undertaking materials characterisation	Operational	P	1	C	HB	B	M	15	Monitor performance	10 years post closure
	Equipment etc stolen during decommissioning	Unacceptable access to site	Lowered level of security after closure	Decommissioning	P	3	C	EX	A	H	4	No existing controls			3	C	EX	A	H	4	Include security in Decommissioning Plan	Prior to decommissioning

Site: KCGM	Focus of Risk Assessment : Mine Closure	Date: 6-8/5/2009
-------------------	--	-------------------------

Activity Area Focus	Hazard or Aspect (SOURCE)	Unwanted Event (RECEPTOR)	Factors Contributing to Unwanted Event (PATHWAY)	Period when expected to occur	Impact Category	Inherent Risk						Existing Controls			Residual Risk						Recommended Action	
						Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Existing or Proposed Controls	When (phase at which Implemented)	Effectiveness of Controls	Consequence	Exposure	Probability	Likelihood	Level (H, M, L)	Rank (1 to 25)	Action	When (proposed implementation time)

GIDJI ROASTER																				
Recovery Borefield	Ineffective decommissioning	Non compliance with licence conditions	Un-capped bores & non rehabilitated pump sites & pipe lines	Post Closure	L	2	O	CE	C	M	16	Developing Closure Plan	Decommissioning	P	2	O	CO	D	L	22
	Spillage	Die off of local vegetation	Breakage along pipeline and discharge of hypersaline water to environment	Post Closure	E	3	C	CE	B	H	8	Bunding in place with catch pits	Post Closure	P	3	O	HB	D	M	17

Consequence Table – Operational Phase

Level	Rating	Safety (S)	Health (H)	Equipment Damage (D)	Production Loss (P)	Environmental (E)	Legal Compliance (L)	Community (C)
1	Insignificant	Minor first aid injuries.	Minor, reversible health effect of no concern.	Easily addressed, superficial damage to equipment, <\$10,000.	Easily addressed, no loss of production.	No or very low environmental impact. Confined to activity area. Economic impact <\$10,000.	Minor technical/legal compliance issue unlikely to attract regulatory response.	Isolated complaint. No media enquiry.
2	Minor	Medical treatment injury.	Medical treatment, reversible health effect of no concern, no disability.	Minor damage to equipment and/or facility causing loss of production, >\$10,000.	Minor retrievable, disruption to production, <1 day loss.	Minor impact but contained within site. Minor wildlife mortality on site. Economic impact <\$100,000.	Technical/legal compliance issue resulting in administration response from regulator. Incident may require follow up reporting to regulator.	Small numbers of sporadic complaints. No media enquiry.
3	Moderate	Lost time injury, restricted work, reversible disability.	Severe, reversible health effect resulting from acute short term exposure or chronic condition, infectious diseases.	Moderate damage to equipment and/or facility requiring plant downtime affecting production, >\$100,000.	Moderate, retrievable loss of production, <1 week loss.	Impact may extend beyond the lease boundary. Multiple wildlife mortalities. Contamination or damage recoverable in moderate period of time (e.g. 1-3 years). Economic impact >\$1M.	Chronic minor regulatory breaches or breach with possible prosecution.	Increasing rate of complaints, repeated complaints from the same area, NGO interest. Media attending primarily with local focus.
4	Major	Lost time injury resulting in extended period off work.	Exposure resulting in irreversible health effect or concern. Permanent disability.	Major damage to facility resulting in extended plant downtime and significant impact on production, >\$1M.	Major damage to facility. Significant irretrievable loss of production, <1 week- <1 month loss.	Regional impact affecting other land uses. Major wildlife mortality. Severe contamination or damage only recoverable in the long term (+3 years). Economic impact >\$10M.	Major breach of regulations resulting in investigation by regulator. Prosecution, penalties or other action likely.	Large number of complaints, repeated complaints from general community and NGO's. Media attention with corporate focus.
5	Catastrophic	Multiple lost time injuries with life-threatening injuries. Fatality(s).	Short term of long term health effects leading to fatalities, or disabling illness leading to early mortality.	Substantial damage to facility requiring protracted repair downtime and long term impact on production, >\$10M.	Future operations at site seriously affected. Long term irretrievable loss of production.	Severe regional effects with likely very long recovery period. Local species destruction. Widespread, chronic damage or contamination with doubtful recovery. Future operations at site uncertain. Economic impact >\$50M.	Serious breach of regulation resulting in operation suspended, licences revoked. High potential for legal action against corporate and site management.	High level of concern or interest from general community and NGO's. Media attention expected to seriously impact.

Consequence Table – Closure Phase

Level	Rating	Safety/Health (S)	Environmental (E)	Legal & Other Obligations (L)	Community & Stakeholder (C)	Financial (F)	Corporate Reputation (R)
1	Insignificant	Minor first aid injuries, reversible health effects.	Very low environmental impact. No off-site impact, confined to small area on-site, no wildlife mortality.	Minor technical/legal compliance issue unlikely to attract regulatory response.	Isolated complaint. No media enquiry.	Easily addressed, <\$10,000 cleanup, <1 cleanup. Petroleum, reagents, ARD or effluent spill in to ground. Only soil removal and disposal on site.	Minor or no inconvenience to the community in the affected area. No social-economic change.
2	Minor	Medical treatment, reversible health impact.	Minor effects on biological or physical environment. Impact confined on-site. Minor wildlife mortality on-site.	Technical/legal compliance issue resulting in 1-3 month notification to regulator. Incident may require follow up reporting to regulator.	Small numbers of sporadic complaints. No media enquiry.	Minor reclamation works requiring GM approval, <\$100,000, <6 month clean up or treatment. Only temporary water treatments required. Petroleum, reagents, ARD or effluent is flowing in to water body occasionally.	Public disturbance in the affected community. Minor social-economic change.
3	Moderate	Significant medical treatment, short term health effect, reversible disability.	Moderate effects on biological or physical environment. Contamination or damage recoverable in moderate period of time. Impact may extend beyond the site boundary. Multiple animal mortalities.	Breach of regulation with possible prosecution. Incident requires immediate (<48 hours) notification to Government.	Increasing rate of complaints, repeated complaints from the same area, NGO interest. Media attending primarily with local focus.	Potential cost implication requiring Regional Office approval, <\$1M capital investment, <\$2M passive treatment cost, 1 to 3 years cleanup or treatment. Passive active water treatment required. Effluent has high reagents, metals or very low or high pH.	Limited local media attention and/or public affected community. Limited social-economic change.
4	Major	Serious medical treatment, irreversible health effect, permanent disability.	Major effects on biological or physical environment. Contamination or damage recoverable in moderate period of time. Impact may extend beyond the site boundary and effects regional water resources. Major animal mortality.	Major breach of regulation resulting in investigation by regulator. Prosecution, penalties or other action likely.	Large number of complaints, repeated complaints from general community and NGO's. Media attention with corporate focus.	Significant cost implications requiring Corporate approval, >\$5M capital investment, >\$15M active treatment cost, 3 to 10 years cleanup or treatment. Permanent active water treatment required. Effluent has remainder high reagent, metals or very low or high pH.	National headlines, disastrous community relations. Significant level of NGO attentions. Significant social-economic change.
5	Catastrophic	Life-threatening injuries, facility(s).	Severe effects on biological or physical environment or extensive nature. Likely very long recovery period. Local species destruction. Widespread, chronic damage or contamination with doubtful recovery. Need to quarantine site.	Serious breach of regulation resulting in operation suspended, licences revoked. High potential for legal action against corporate and site management.	High level of concern or interest from general community and NGO's. Media attention expected to seriously impact.	Requiring Board approval, >\$10M capital investment, >\$30M active treatment cost, perpetual treatment. Building of water containment ponds and immediate permanent active water treatment required. Effluent has high remainder reagent, metals or very low or high pH.	International headlines, disastrous community relations. High level of NGO attention. Massive social-economic change.

Likelihood Calculator

Use when evaluating Safety, Health or Security Risk		PROBABILITY FACTOR (chance of consequence occurring as a result of the unwanted event)				
		Very difficult to imagine how it could occur "VD"	Conceivable, but only in extreme circumstances "CO"	Has been known to have happened "HB"	Could easily happen "CE"	Expected to happen every time "EX"
EXPOSURE FACTOR (frequency of exposure to the unwanted event or the circumstances that can result in the unwanted event)	Continuous (all the time) "C"	Unlikely (D)	Possible (C)	Likely (B)	Likely (B)	Almost Certain (A)
	Frequent (once a month or so) "F"	Unlikely (D)	Possible (C)	Possible (C)	Likely (B)	Likely (B)
	Occasional (once or twice a year) "O"	Rare (E)	Unlikely (D)	Unlikely (D)	Possible (C)	Possible (C)
	Unusual (once or twice in 10 years) "U"	Rare (E)	Rare (E)	Unlikely (D)	Unlikely (D)	Unlikely (D)
	Remote (once or twice in 100 years) "R"	Rare (E)	Rare (E)	Rare (E)	Rare (E)	Unlikely (D)

Use when evaluating Environmental Risk		PROBABILITY FACTOR (chance of consequence occurring as a result of the unwanted event)				
		Rare (E)	Unlikely (D)	Possible (C)	Likely (B)	Almost Certain (A)

Risk Matrix

			CONSEQUENCE				
			1	2	3	4	5
			Insignificant	Minor	Moderate	Major	Catastrophic
LIKELIHOOD	A	Almost Certain	M ₁₁	H ₇	H ₄	H ₂	H ₁
	B	Likely	M ₁₅	M ₁₂	H ₈	H ₅	H ₃
	C	Possible	M ₁₈	M ₁₆	M ₁₃	M ₉	H ₆
	D	Unlikely	L ₂₃	L ₂₂	M ₁₇	M ₁₄	M ₁₀
	E	Rare	L ₂₅	L ₂₄	L ₂₁	L ₂₀	L ₁₉