



APPENDIX HH FAILURE MODES AND EFFECTS ANALYSIS



Project Risk and Opportunities Register

Document No. 1593900100-RR-G0001-00
 Project Name: Goliath Gold
 Project No. 734-1593900100
 Client: Treasury Metals
 Risk Assessed: January 31 - February 2, 2015

Risk Rank of High (H1 - H9)
 Risk Rank of Medium (M11 - M17)
 Risk Rank of Low (L18 - L25)

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Residual Risk					
					Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
3	Dam breach / rupture / spill	Human injury, damage to property, spill, release to environment, contamination to groundwater and surface water, loss of production, cost, regulatory non-compliance, damage to property (treasury, personal, private and other industry), damaged to surrounding environment, reputation	Tailings - Tailing Storage Facility - Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Third Party Review, Emergency Response Plan, Predictive Modelling, TSF Surveillance/Monitoring, Groundwater Monitoring	Reputation	Level 5	Rare	E	5	H 9
4	Clearing of 240 ha of vegetation involving heavy equipment	Accidents, collisions, spills, air emissions, human injury, contact with wildlife, removal of habitat (vegetation, wetlands), generation of deleterious substances (silt and soil), fire, and waste management	General Development - Bulk Earthworks/ Site Preparation - Clearing of 240 ha of vegetation	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Training, Spill Management Plan, Wildlife Management Plan	Environment	Level 2	Almost Certain	A	2	M 11
5	Civil earth works involving heavy equipment use	Accidents, collisions, spills, air emissions, human injury, contact with wildlife, removal of habitat (wetlands); generation of deleterious substances (silt and soil)	General Development - Bulk Earthworks/ Site Preparation - Civil Earth Work	Safe Work Procedures, Standard Operating Procedures, Training, Wildlife Management Plan, Spill Management Plan	Environment	Level 2	Almost Certain	A	2	M 11
6	Road development works involving heavy equipment use - storage of road material	Accidents, collisions, spills, air emissions, human injury, contact with wildlife, removal of habitat (vegetation, wetlands), generation of deleterious substances (silt and soil)	General Development - Site Roads - Development of Roads	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan	Environment	Level 2	Almost Certain	A	2	M 11
7	Material release / spill / splash / fumes/ gas generation	Human injury, equipment damage, loss of production, release to environment	Process Reagents -Storage/Distribution	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design), Health and Safety Plan, PPE, Spill Management Plan	Safety and Health	Level 4	Unlikely	D	4	M 13
8	Use of CN solution	Spill / spray / release (injury, damage, loss of production)	Acid Wash and Elution - Elution Operations	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design Spray Guards), Health and Safety Plan, PPE, Spill Management Plan	Safety and Health	Level 4	Unlikely	D	4	M 13
9	Equipment failure	Spill / spray / release (injury, damage, loss of production), fire, flying debris	Acid Wash and Elution - Elution Operations	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design Spray Guards), Health and Safety Plan, PPE, Spill Management Plan	Safety and Health	Level 4	Unlikely	D	4	M 13
10	Structural failure	Human injury, inadequate ventilation, equipment damage, instable ground, loss of emergency egress, damage to reputation	Mining Underground - Lateral Development - Structure of Drift	Engineering, Spill Management Plan, Standard Operating Procedures; Best Management Practices	Safety and Health	Level 4	Unlikely	D	4	M 13
11	Structural failure	Human injury, inadequate ventilation, equipment damage, instable ground, loss of emergency egress, damage to reputation	Mining Underground - Vertical Development - Structure of Shaft	Engineering, Engineering QA, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training	Safety and Health	Level 4	Unlikely	D	4	M 13
12	Structural failure / inadequate capacity	Human injury, inadequate ventilation, equipment damage, instable ground, loss of emergency egress, damage to reputation	Mining Underground - Ventilation Shafts - Structure of Shaft	Engineering, Engineering QA, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training	Safety and Health	Level 4	Unlikely	D	4	M 13
13	Equipment / operator failure	Molten metal spill (human injury, equipment damage; loss of production), fire	Smelting Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Shut-down Procedures	Safety and Health	Level 4	Unlikely	D	4	M 13
14	Breakage of pipe / delivery system	Loss of fresh air supply to refuge stations (potential loss of life); loss of "power" to pneumatic equipment (loss of production); human injury (equipment or line failure)	U/G Mining Infrastructure - Air and Water - Compressed Air	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Emergency Response Plan, Health and Safety Plan, PPE	Safety and Health	Level 3	Unlikely	D	3	M 15
15	Disruption of electrical protection system	Electrocution (human injury)	Electrowinning/Gold Room - General electrowinning operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE	Safety and Health	Level 3	Unlikely	D	3	M 15
16	Protection failures	Property damage, damage to equipment, human injury, electrocution	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Operation	Standard Operating Procedures; Best Management Practices, Engineering	Safety and Health	Level 3	Unlikely	D	3	M 15

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
17	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, communication with haul trucks	Air emissions, dust, noise, accidents, collisions (vehicle, wildlife, livestock), fire, spills, human injury	Offsite Infrastructure - Offsite Access Road - Transportation - Heavy equipment	Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training, Wildlife Management Plan, Emergency Response Plan, Spill Management Plan	Environment	Level 3	Unlikely	D	3	M 15
18	Collisions	Human injury, property damage	U/G Mining Infrastructure - Underground Electrical Substation and Distribution -Power	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, PPE	Safety and Health	Level 3	Unlikely	D	3	M 15
19	Contact / collisions	Fire, equipment damage, human injury, congestion	U/G Mining Infrastructure - Underground Explosive Magazine - Storage	BMPs and Plans	Safety and Health	Level 3	Unlikely	D	3	M 15
20	Contact / collisions / weather (i.e. lightning)	Fire, equipment damage, human injury	OP Mining Infrastructure - Explosive Magazine - Storage	Emergency Response Plan, Explosives Management Plan, Security System, Standard Operating Procedures; Best Management Practices, Regulatory Permits	Safety and Health	Level 3	Unlikely	D	3	M 15
21	Material release / spill / splash / fumes/ gas generation	Human injury, equipment damage, loss of production, release to environment	Process Reagents -Storage/Distribution	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design), Health and Safety Plan, PPE, Spill Management Plan	Environment	Level 3	Unlikely	D	3	M 15
22	Use of CN solution	Spill / spray / release (injury, damage, loss of production)	Acid Wash and Elution - Elution Operations	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design Spray Guards), Health and Safety Plan, PPE,	Environment	Level 3	Unlikely	D	3	M 15
23	Equipment failure	Spill / spray / release (injury, damage, loss of production), fire, flying debris	Acid Wash and Elution - Elution Operations	Spill Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design Spray Guards), Health and Safety Plan, PPE,	Environment	Level 3	Unlikely	D	3	M 15
26	Improper procedure, equipment failure	Production of HCN	Process Reagents -Preparation	Spill Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design), Health and Safety Plan, PPE,	Safety and Health	Level 4	Rare	E	4	M 16
27	Improper procedure, equipment failure	Production of HCN	Process Reagents -Preparation	Spill Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design), Health and Safety Plan, PPE,	Reputation	Level 4	Rare	E	4	M 16
28	Mechanical / instrumentation failure	Off-gassing of HCN, loss of production, fire (e.g., agitator motors)	CIL - CIL Operation	Spill Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE,	Safety and Health	Level 4	Rare	E	4	M 16
29	Mechanical / instrumentation failure	Off-gassing of HCN, loss of production, fire (e.g., agitator motors)	CIL - CIL Operation	Spill Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE,	Reputation	Level 4	Rare	E	4	M 16
30	Fire / explosion	Property damage, human injury, air pollution, release of fuel to air	Utilities - Fuel, Storage, & Distribution - Natural Gas - Natural Gas Use	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 4	Rare	E	4	M 16
31	Structural failure / inadequate capacity	Human Injury, Inadequate Ventilation, equipment damage, Instable ground, loss of emergency egress, damage to reputation	U/G Mining Infrastructure - Portal Infrastructure Structure of Portal	Design, Standard Operating Procedures; Best Management Practices, Engineering QA, Emergency Response Plan	Safety and Health	Level 4	Rare	E	4	M 16
32	Improper operation and maintenance	Human injury, equipment damage, loss of production	Primary Grinding -Overhead Crane	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE,	Safety and Health	Level 4	Rare	E	4	M 16
33	Improper operation and maintenance	Human injury, equipment damage, loss of production	Overhead Crane	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE,	Safety and Health	Level 4	Rare	E	4	M 16
34	Contact with equipment (snow removal / grading)	Property damage, human injury, electrocution	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Maintenance	Government Regulation and Log Book, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA	Safety and Health	Level 4	Rare	E	4	M 16
35	Back-feeding from emergency power	Property damage, damage to equipment, loss of production, human injury, electrocution	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Operation	Standard Operating Procedures; Best Management Practices, Engineering	Safety and Health	Level 4	Rare	E	4	M 16

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36	Access for public / staff, access to equipment, threat to security, safety	Unwanted access by unauthorized persons to site or areas of the plant, human injury, access to equipment/explosives, damage to equipment and sampling locations	General Development - Fencing/Gates (Site Control), Access to mine site and remote sampling locations (on and off property)	Engineering (CC-TV, Fence and Gates), Health and Safety Plan, Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan	Safety and Health	Level 4	Rare	E	4	M 16
37	Electrocution	Contact with humans, human injury, property damage, inadequate training	U/G Mining Infrastructure - Underground Electrical Substation and Distribution - Power	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering (Design/Control), Engineering QA, PPE	Safety and Health	Level 4	Rare	E	4	M 16
38	Electrocution	Contact with humans, human injury, property damage, inadequate training	U/G Mining Infrastructure - Underground Electrical Substation and Distribution - Power	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering (Design/Control), Engineering QA, PPE	Reputation	Level 4	Rare	E	4	M 16
39	Electrocution	Contact with humans, human injury, property damage, inadequate training	OP Mining Infrastructure - Electrical Substation and Distribution - Power	Emergency Response Plan, Engineering, Standard Operating Procedures; Best Management Practices, Training, PPE	Safety and Health	Level 4	Rare	E	4	M 16
40	Electrocution	Contact with humans, human injury, property damage, inadequate training	OP Mining Infrastructure - Electrical Substation and Distribution - Power	Emergency Response Plan, Engineering, Standard Operating Procedures; Best Management Practices, Training, PPE	Reputation	Level 4	Rare	E	4	M 16
41	Electrocution	Loss of production, loss of safety infrastructure, property damage, human injury	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Power Operations	Design, Standard Operating Procedures; Best Management Practices, Training, PPE	Safety and Health	Level 4	Rare	E	4	M 16
42	Electrocution	Loss of production, loss of safety infrastructure, property damage, human injury	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Power Operations	Design, Standard Operating Procedures; Best Management Practices, Training, PPE	Reputation	Level 4	Rare	E	4	M 16
43	Electrocution	Loss of production, loss of safety infrastructure, property damage, human injury	Utilities - Power & Electrical - Power Distribution - Power Operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training, PPE	Safety and Health	Level 4	Rare	E	4	M 16
44	Electrocution	Loss of production, loss of safety infrastructure, property damage, human injury	Utilities - Power & Electrical - Power Distribution - Power Operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training, PPE	Reputation	Level 4	Rare	E	4	M 16
45	Electrocution	Loss of production, loss of safety infrastructure, property damage, human injury	Utilities - Power & Electrical - Emergency Power - Emergency Power Operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Safety and Health	Level 4	Rare	E	4	M 16
46	Electrocution	Loss of production, loss of safety infrastructure, property damage, human injury	Utilities - Power & Electrical - Emergency Power - Emergency Power Operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Reputation	Level 4	Rare	E	4	M 16
47	Fire / explosion	Property damage, human injury, air pollution, release of fuel to air, or environment (-45 or less)	Utilities - Fuel, Storage, & Distribution - Propane - Propane Use	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 3	Rare	E	3	M 17
48	Contact with property resulting in damage (mobile equipment, human)	Loss of production, human injury, damage to property, release to the air, fire, explosion	Utilities - Fuel, Storage, & Distribution - Propane - Propane Fork Lifts	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 3	Rare	E	3	M 17
49	Contact with lines resulting in damage (mobile equipment, human)	Loss of production, human injury, damage to property, release to the air, fire, explosion	Utilities - Fuel, Storage, & Distribution - Natural Gas - Natural Gas	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 3	Rare	E	3	M 17
50	Falls	Human injury, reputation, equipment damage / loss of equipment	Mining Underground - Vertical Development - Development	Engineering, Engineering QA, Spill Management Plan, Standard Operating Procedures; Best Management Practices, Training	Safety and Health	Level 3	Rare	E	3	M 17
51	Falls	Human injury, equipment damage	U/G Mining Equipment - Fixed Equipment - Gates and Chutes	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering, Engineering QA, PPE, Air Monitors	Safety and Health	Level 3	Rare	E	3	M 17
52	Slips, trips, falling into equipment (sumps)	Human injury, drowning	U/G Mining Infrastructure - Pump Station (Dewatering) -Sumps	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures, PPE	Safety and Health	Level 3	Rare	E	3	M 17

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53	Slips, trips, falling into equipment (sumps)	Human injury, drowning	U/G Mining Infrastructure - Pump Station (Dewatering) - Sumps	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures, PPE	Reputation	Level 3	Rare	E	3	M 17
54	Natural gas leak	Human injury, explosion, fire, and loss of production, damage of equipment	U/G Mining Infrastructure - Mine Heating - Heating	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Emergency Response Plan, Engineering, Engineering QA, Training	Safety and Health	Level 3	Rare	E	3	M 17
55	Burner malfunction	Fire, explosion, human injury, equipment damage, loss of production	Carbon Regeneration - Operation of horizontal kiln	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Emergency Response Plan, Engineering (Design), Engineering QA, Health and Safety Plan, PPE, Spill Management Plan	Safety and Health	Level 3	Rare	E	3	M 17
56	Dam breach / rupture / spill	Human injury, damage to property, spill, release to environment, contamination to groundwater and surface water, loss of production, cost, regulatory non-compliance, damage to property (Treasury, personal, private and other industry), damaged to surrounding environment, reputation	Tailings - Tailing Storage Facility - Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Third Party Review, Emergency Response Plan, Predictive Modelling, TSF Surveillance/Monitoring, Groundwater Monitoring	Safety and Health	Level 3	Rare	E	3	M 17
57	Dam breach / rupture / spill	Human injury, damage to property, spill, release to environment, contamination to groundwater and surface water, loss of production, cost, regulatory non-compliance, damage to property (Treasury, personal, private and other industry), damaged to surrounding environment, reputation	Tailings - Tailing Storage Facility - Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Third Party Review, Emergency Response Plan, Predictive Modelling, TSF Surveillance/Monitoring, Groundwater Monitoring	Environment	Level 3	Rare	E	3	M 17
58	Equipment / instrumentation failure	Process failure (insufficient CN destruction leading to higher CN in TSF), fire (e.g., agitator motors)	Cyanide Destruction - System Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, Shut-down Procedures	Environment	Level 3	Rare	E	3	M 17
59	Failure for dewatering equipment	Unable to dewater, flooding of work areas, human injury, damage to property and equipment, fire	OP Mining Infrastructure - Pump Station (Dewatering) - Pumping / Dewatering	Emergency Response Plan, Engineering, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Safety and Health	Level 3	Rare	E	3	M 17
60	Breach to pipeline / blockage	Flooding, unable to remove water	OP Mining Infrastructure - Pump Station (Dewatering) - Pumping / Dewatering	Emergency Response Plan, Engineering, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Safety and Health	Level 3	Rare	E	3	M 17
63	Drowning	Human injury, reputation	Maintenance / Inspection	Standard Operating Procedures; Best Management Practices, PPE, Engineering (Design/Control/QA/QC)	Safety and Health	Level 3	Rare	E	3	M 17
64	Failure for dewatering equipment	Unable to dewater, flooding of work areas, human injury, damage to property and equipment, fire	U/G Mining Infrastructure - Pump Station (Dewatering) - Pumping / Dewatering	Standard Operating Procedures; Best Management Practices, Emergency Response, Maintenance Procedures	Safety and Health	Level 3	Rare	E	3	M 17
65	Breach to pipeline / blockage	Flooding, unable to remove water	U/G Mining Infrastructure - Pump Station (Dewatering) - Pumping / Dewatering	Maintenance Procedures	Safety and Health	Level 3	Rare	E	3	M 17
66	Tank failure (780 m ³)	Ground contamination, ground / surface water contamination, human injury, equipment damage, loss of production	CIL - CIL Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Shut-down Procedures, Engineering (Design), Engineering QA, PPE	Safety and Health	Level 3	Rare	E	3	M 17
67	Tank failure (780 m ³)	Ground contamination, ground / surface water contamination, human injury, equipment damage, loss of production	CIL - CIL Operation	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Shut-down Procedures, Engineering (Design), Engineering QA, PPE	Environment	Level 3	Rare	E	3	M 17
68	Tank spillage / overflow	Ground contamination, ground / surface water contamination, human injury, equipment damage, loss of production	CIL Operation	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE	Safety and Health	Level 3	Rare	E	3	M 17
69	Tank spillage / overflow	Ground contamination, ground / surface water contamination, human injury, equipment damage, loss of production	CIL Operation	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE	Environment	Level 3	Rare	E	3	M 17
70	Spill / splash of electrolyte	Human injury, environmental release	General electrowinning operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE	Safety and Health	Level 3	Rare	E	3	M 17
71	Spill / splash of electrolyte	Human injury, environmental release	General electrowinning operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE	Environment	Level 3	Rare	E	3	M 17

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
72	Tank failure (250 m3)	Ground contamination, ground / surface water contamination, human injury, equipment damage, loss of production	Cyanide Destruction - System Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, Shut-down Procedures	Safety and Health	Level 3	Rare	E	3	M 17
73	Tank failure (250 m3)	Ground contamination, ground / surface water contamination, human injury, equipment damage, loss of production	Cyanide Destruction - System Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, Shut-down Procedures	Environment	Level 3	Rare	E	3	M 17
74	Equipment / instrumentation failure	Process failure (insufficient CN destruction leading to higher CN in TSF), fire (e.g., agitator motors)	Cyanide Destruction - System Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, Shut-down Procedures	Safety and Health	Level 3	Rare	E	3	M 17
75	Spill / splash / off gas	Human injury, environmental release (e.g., of SO2)	Cyanide Destruction - System Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA, Shut-down Procedures	Safety and Health	Level 3	Rare	E	3	M 17
76	Spill / splash / off gas	Human injury, environmental release (e.g., of SO2)	Cyanide Destruction - System Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA, Shut-down Procedures	Environment	Level 3	Rare	E	3	M 17
77	Heavy equipment moving, more equipment on site, spill from equipment failure (mobile), accidents and equipment damage	Accidents, collisions, spills, human injury, generation of deleterious substances (silt and soil), release of untreated 'Contact Water', mixing 'contact water' and non 'contact water'	General Development - Site Drainage - Construction of drainage system	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Training, Spill Management Plan, Wildlife Management Plan	Environment	Level 2	Likely	C	2	L 19
78	Mining involving heavy equipment use	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	U/G Mining Equipment - Mobile Equipment - Transportation - Heavy equipment (resources to Mine pad)	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Spill Management Plan	Environment	Level 2	Likely	C	2	L 19
79	Mining involving heavy equipment use	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	U/G Mining Equipment - Mobile Equipment - Transportation - Movement of Staff and Maintenance vehicles	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Spill Management Plan	Environment	Level 2	Likely	C	2	L 19
80	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, Heavy debris (resource rocks), communication with haul trucks	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	OP Mining Equipment - Mobile Equipment - Transportation - Heavy equipment (resources to Mine pad)	Standard Operating Procedures; Best Management Practices, Training, Emergency Response Plan, Traffic Management Plan, Spill Management Plan	Environment	Level 2	Likely	C	2	L 19
81	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, heavy debris (resource rocks), poor communication with heavy equipment	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	OP Mining Equipment - Mobile Equipment - Transportation - Movement of Staff and Maintenance vehicles	Standard Operating Procedures; Best Management Practices, Training, Emergency Response Plan, Traffic Management Plan, Spill Management Plan	Environment	Level 2	Likely	C	2	L 19
82	Congestion, collisions	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Temporary Facilities - Construction Laydown Area - Operation of Laydown Area	Standard Operating Procedures; Best Management Practices, Emergency Response Plan, Traffic Management Plan, Spill Management Plan, Engineering (Design/Control/QA/QC)	Environment	Level 2	Likely	C	2	L 19
83	Removal of public road, increase in back country access(due to road closure)	Back country access increase, increase of traffic along hydro route, accidents	General Development - Site Roads - Road Closures because of Site Roads	Traffic Management Plan, Engineering (Perimeter Fence), Standard Operating Procedures; Best Management Practices	Safety and Health	Level 1	Expected	B	1	L 20
84	Access to equipment, threat to security, safety	Unwanted access by unauthorized persons to site or areas of the plant, human injury, access to equipment/explosives, damage to equipment and sampling locations; damage to sampling locations	General Development - Site Communication & Security System - Access to site; mine site and remote sampling locations	Engineering (CC-TV, Fence and Gates), Engineering (Radio System and Phones), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Safety and Health	Level 1	Expected	B	1	L 20
85	Release of drilling water (contact)	Break of a line, human injury, flooding, increase in sediment in contact water (for treatment later)	Mining Underground - Lateral Development - Drilling	Engineering (Water Collection), Standard Operating Procedures; Best Management Practices	Environment	Level 1	Expected	B	1	L 20
86	Release of drilling water (contact)	Break of a line, human injury, flooding, increase in sediment in contact water (for treatment later)	Mining Underground - Vertical Development - Drilling	Engineering, Spill Management Plan, Standard Operating Procedures; Best Management Practices	Environment	Level 1	Expected	B	1	L 20
87	Release of drilling water (contact)	Break of a line, human injury, flooding, increase in sediment in contact water (for treatment later)	Mining Underground - Lateral Development - Drilling	Engineering (water collection), Standard Operating Procedures; Best Management Practices	Safety and Health	Level 1	Expected	B	1	L 20
88	Release of drilling water (contact)	Break of a line, human injury, flooding, increase in sediment in contact water (for treatment later)	Mining Underground - Vertical Development - Drilling	Engineering, Spill Management Plan, Standard Operating Procedures; Best Management Practices	Safety and Health	Level 1	Expected	B	1	L 20
89	Structural failure	Human injury, inadequate ventilation, equipment damage, instable ground, loss of emergency egress, damage to reputation	Mining Underground - Vertical Development - Structure of Shaft	Engineering QA, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training	Reputation	Level 2	Unlikely	D	2	L 21
90	Structural failure / inadequate capacity	Human injury, inadequate ventilation, equipment damage, instable ground, loss of emergency egress, damage to reputation	Mining Underground - Ventilation Shafts - Structure of Shaft	Engineering QA, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training	Reputation	Level 2	Unlikely	D	2	L 21
91	Insufficient drainage, habitat alteration	Habitat damage, flooding, road washout	General Development - Site Roads - Development of Road Crossing (culverts)	Standard Operating Procedures; Best Management Practices, Training, Traffic Management Plan, Surface Water Management Plan, Engineering QA/QC	Environment	Level 2	Unlikely	D	2	L 21

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92	Clearing of 240 ha of vegetation involving heavy equipment use	Accidents, collisions, spills, air emissions, human injury, contact with wildlife, removal of habitat (vegetation, wetlands), generation of deleterious substances (silt and soil), fire, and waste management	General Development - Bulk Earthworks/ Site Preparation - Clearing of 240 ha of vegetation	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan, Spill Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
93	Civil earth works involving heavy equipment use	Accidents, collisions, spills, air emissions, human injury, contact with wildlife, removal of habitat (wetlands); generation of deleterious substances (silt and soil)	General Development - Bulk Earthworks/ Site Preparation - Civil Earth Work	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan, Spill Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
94	Heavy equipment moving, more equipment on site, spill from equipment failure (mobile), Accidents and equipment damage	accidents, collisions, spills, human injury, generation of deleterious substances (silt and soil), release of untreated 'Contact Water', mixing 'contact water' and non 'contact water'	General Development -Site Drainage - Construction of drainage system	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Training, Spill Management Plan, Wildlife Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
95	Spills from equipment	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	Mining Underground - Lateral Development - Drilling	Engineering, Spill Management Plan, Standard Operating Procedures; Best Management Practices	Safety and Health	Level 2	Unlikely	D	2	L 21
96	Structural failure	Human injury, inadequate ventilation, equipment damage, instable ground, loss of emergency egress, damage to reputation	Mining Underground - Lateral Development - Structure of Drift	Engineering, Spill Management Plan, Standard Operating Procedures; Best Management Practices	Reputation	Level 2	Unlikely	D	2	L 21
97	Spills from equipment	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	Mining Underground - Vertical Development - Drilling	Engineering, Spill Management Plan, Standard Operating Procedures; Best Management Practices, Training	Safety and Health	Level 2	Unlikely	D	2	L 21
98	Mining involving heavy equipment use	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	U/G Mining Equipment - Mobile Equipment - Transportation - Heavy equipment (resources to Mine pad)	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Spill Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
99	Mining involving heavy equipment use	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	U/G Mining Equipment - Mobile Equipment - Transportation - Movement of Staff and Maintenance vehicles	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Spill Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
100	Power failure (ventilation, dewatering and lighting)	Human injury, poor / no air quality, unable to dewater, flooding of open pit, loss of lighting	U/G Mining Infrastructure - Underground Electrical Substation and Distribution -Power	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering (Air Monitors), Engineering QA, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
101	Power failure (ventilation, dewatering and lighting)	Human injury, poor / no air quality, unable to dewater, flooding of open pit, loss of lighting	U/G Mining Infrastructure - Underground Electrical Substation and Distribution -Power	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering (Air Monitors), Engineering QA, PPE	Reputation	Level 2	Unlikely	D	2	L 21
102	Fire	Contact with humans, human injury, damage to property / equipment, air quality	U/G Mining Infrastructure - Underground Electrical Substation and Distribution -Power	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering (Design/Control), Engineering QA, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
103	Fire	Contact with humans, human injury, damage to property / equipment, air quality	U/G Mining Infrastructure - Underground Electrical Substation and Distribution -Power	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering (Design/Control), Engineering QA, PPE	Reputation	Level 2	Unlikely	D	2	L 21
104	Vehicle accidents / collisions with other equipment / snow removal	Vehicle congestion / traffic, human injury, fire, spills, equipment damage, animal contact	U/G Mining Infrastructure - Portal Infrastructure Transportation	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
105	Heavy equipment moving, more equipment on site, spill from equipment failure (mobile), accidents and equipment damage	Accidents, collisions, spills, air emissions, human injury, contact with wildlife, removal of habitat (vegetation, wetlands), generation of deleterious substances (silt and soil), fire, and waste management, dust generation	Mining - Infrastructure Development (Capital) - Pre-Mine stripping of Topsoil	Pre-Mine Plan, Wildlife Management Plan, Standard Operating Procedures; Best Management Practices, Training, Design	Safety and Health	Level 2	Unlikely	D	2	L 21
106	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage	Dust, noise, accidents, collisions, spills, human injury, contact with wildlife, removal of habitat (vegetation, wetlands), generation of deleterious substances (silt, soil), fire, and waste management	Mining - Infrastructure Development (Capital) - Stripping of Overburden	Mine Plan, Wildlife Management Plan, Standard Operating Procedures; Best Management Practices, Training, Design	Safety and Health	Level 2	Unlikely	D	2	L 21
107	heavy equipment moving, spill from equipment failure (mobile), Accidents and equipment damage, Heavy debris (resource rocks), Communication with Haul trucks	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	OP Mining Equipment - Mobile Equipment - Transportation - Heavy equipment (resources to Mine pad)	Standard Operating Procedures; Best Management Practices, Training, Emergency Response Plan, Traffic Management Plan, Spill Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
108	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, heavy debris (resource rocks), poor communication with heavy equipment	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	OP Mining Equipment - Mobile Equipment - Transportation - Movement of Staff and Maintenance vehicles	Standard Operating Procedures; Best Management Practices, Training, Emergency Response Plan, Traffic Management Plan, Spill Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
109	Inadequate response to an emergency	Human injury, equipment damage, fire	OP Mining Equipment - Mine Rescue Team Equipment - Emergency Response	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
110	Power failure (ventilation, dewatering and lighting)	Human injury, poor/no air quality, unable to dewater, flooding of open pit, loss of lighting	OP Mining Infrastructure - Electrical Substation and Distribution - Power	Emergency Response Plan, Engineering, Standard Operating Procedures; Best Management Practices, Training, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
111	Power failure (ventilation, dewatering and lighting)	Human injury, poor/no air quality, unable to dewater, flooding of open pit, loss of lighting	OP Mining Infrastructure - Electrical Substation and Distribution - Power	Emergency Response Plan, Engineering, Standard Operating Procedures; Best Management Practices, Training, PPE	Reputation	Level 2	Unlikely	D	2	L 21
112	Fire	Contact with humans, human injury, damage to property / equipment, air quality	OP Mining Infrastructure - Electrical Substation and Distribution - Power	Emergency Response Plan, Engineering, Standard Operating Procedures; Best Management Practices, Training, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
113	Fire	Contact with humans, human injury, damage to property / equipment, air quality	OP Mining Infrastructure - Electrical Substation and Distribution - Power	Emergency Response Plan, Engineering, Standard Operating Procedures; Best Management Practices, Training, PPE	Reputation	Level 2	Unlikely	D	2	L 21
114	Fire	Loss of production, loss of safety infrastructure, property damage, human injury, impact to air quality	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Power Operations	Design, Standard Operating Procedures; Best Management Practices, Training, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
115	Fire	Loss of production, loss of safety infrastructure, property damage, human injury, impact to air quality	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Power Operations	Design, Standard Operating Procedures; Best Management Practices, Training, PPE	Reputation	Level 2	Unlikely	D	2	L 21
116	Fire	Loss of production, loss of safety infrastructure, property damage, human injury, impact to air quality	Utilities - Power & Electrical - Power Distribution - Power Operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Training, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
117	Fire	Loss of production, loss of safety infrastructure, property damage, human injury, impact to air quality	Utilities - Power & Electrical - Power Distribution - Power Operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Training, PPE	Reputation	Level 2	Unlikely	D	2	L 21
118	Inadequate maintenance	property damage, Loss of production, loss of safety infrastructure, human injury	Utilities - Power & Electrical - Emergency Power - Maintenance of Emergency Power	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
119	Inadequate maintenance	property damage, Loss of production, loss of safety infrastructure, human injury	Utilities - Power & Electrical - Emergency Power - Maintenance of Emergency Power	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Reputation	Level 2	Unlikely	D	2	L 21
120	Fire	Loss of production, loss of safety infrastructure, property damage, human injury, impact to air quality	Utilities - Power & Electrical - Emergency Power - Emergency Power Operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
121	Fire	Loss of production, loss of safety infrastructure, property damage, human injury, impact to air quality	Utilities - Power & Electrical - Emergency Power - Emergency Power Operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Reputation	Level 2	Unlikely	D	2	L 21
122	Spills from equipment	Accidents, collisions, spills, human injury	Utilities - Power & Electrical - Emergency Power - Emergency Power operations	Design, Spill Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21
123	Congestion, collisions	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Ancillary Facilities - Warehouse - Operation	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Spill Management Plan, Emergency Response Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
124	Congestion, collisions	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Ancillary Facilities - Security / Scale House - Operation	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Spill Management Plan, Emergency Response Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
125	Congestion, collisions	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Temporary Facilities - Construction Laydown Area - Operation of Laydown Area	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Spill Management Plan, Emergency Response Plan, Traffic Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
126	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, communication with haul trucks	Air emissions, dust, noise, accidents, collisions (vehicle, wildlife, livestock), fire, spills, human injury	Offsite Infrastructure - Offsite Access Road - Transportation - Heavy equipment	Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training, Wildlife Management Plan, Emergency Response Plan, Spill Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
127	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, poor communication with heavy equipment	Air emissions, dust, noise, accidents, collisions (vehicle, wildlife, livestock), fire, spills, human injury	Transportation - Movement of Staff and Maintenance vehicles	Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan, Emergency Response Plan, Spill Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
128	Contact with wildlife, access for public, access to equipment, threat to security	Human injury, attraction of wildlife, theft, access to equipment/explosives	General Development - Fencing/Gates (Site Control) - Installing and Operation of fencing and gate	Engineering (Fence and Gates), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan	Environment	Level 2	Unlikely	D	2	L 21
129	Access for public / staff, access to equipment, threat to security, safety	Unwanted access by unauthorized persons to site or areas of the plant, human injury, access to equipment/explosives, damage to equipment and sampling locations	General Development - Fencing/Gates (Site Control), Access to mine site and remote sampling locations (on and off property)	Engineering (CC-TV, Fence and Gates), Health and Safety Plan, Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan	Environment	Level 2	Unlikely	D	2	L 21
130	Access to equipment, threat to security, safety	Unwanted access by unauthorized persons to site or areas of the plant, human injury, access to equipment/explosives, damage to equipment and sampling locations; damage to sampling locations	General Development - Site Communication & Security System - Access to site, mine site and remote sampling locations	Engineering (CC-TV, Fence and Gates), Engineering (Radio System and Phones), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Environment	Level 2	Unlikely	D	2	L 21
131	Use of HCl	Spill / spray / release (injury, damage, loss of production)	Acid Wash and Elution - Acid Washing Operations	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design Spray Guards), Health and Safety Plan, PPE, Spill Management Plan	Environment	Level 2	Unlikely	D	2	L 21
132	Equipment failure	Spill / spray / release (injury, damage, loss of production)	Acid Wash and Elution - Acid Washing Operations	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design Spray Guards), Health and Safety Plan, PPE, Spill Management Plan	Environment	Level 2	Unlikely	D	2	L 21
135	Congestion, collisions	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Ancillary Facilities - Warehouse - Operation	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Spill Management Plan, Emergency Response Plan	Environment	Level 2	Unlikely	D	2	L 21
136	Congestion, collisions	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Ancillary Facilities -Security / Scale House - Operation	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Spill Management Plan	Environment	Level 2	Unlikely	D	2	L 21
137	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, poor communication with heavy equipment	Air emissions, dust, noise, accidents, collisions (vehicle, wildlife, livestock), fire, spills, human injury	Transportation - Movement of Staff and Maintenance vehicles	Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan, Emergency Response Plan, Spill Management Plan	Environment	Level 2	Unlikely	D	2	L 21
138	Removal of public road, increase in back country access(due to road closure)	Back country access increase, increase of traffic along hydro route, accidents	General Development - Site Roads - Road Closures because of Site Roads	Traffic Management Plan, Engineering (Perimeter Fence), Standard Operating Procedures; Best Management Practices	Reputation	Level 2	Unlikely	D	2	L 21
139	Access to equipment, threat to security, safety	Unwanted access by unauthorized persons to site or areas of the plant, human injury, access to equipment/explosives, damage to equipment and sampling locations; damage to sampling locations	General Development - Site Communication & Security System - Access to site, mine site and remote sampling locations	Engineering (CC-TV, Fence and Gates), Engineering (Radio System and Phones), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Reputation	Level 2	Unlikely	D	2	L 21
140	Uncontrolled release of site water: increase of the volume of water down stream (temporary increase)	Uncontrolled water release, release of deleterious substances (silt and soil), increase in volume; effect to down stream water quality / quantity; removal of habitat (FISH RELOCATION?)	General Development - Site Drainage - Dewatering of site (Surface water changes with ponds and General Arrangement area)	Water Management Plan, Engineering (Design), Standard Operating Procedures; Best Management Practices, Training, Spill Management Plan, Regulatory Permits	Environment	Level 2	Unlikely	D	2	L 21
141	Road development works involving heavy equipment use , storage of road material	Accidents, collisions, spills, air emissions, human injury, contact with wildlife, removal of habitat (vegetation, wetlands), generation of deleterious substances (silt and soil)	General Development - Site Roads -Development of Roads	Safe Work Procedures, Standard Operating Procedures, Training, Wildlife Management Plan, Spill Management Plan	Safety and Health	Level 2	Unlikely	D	2	L 21
142	Precipitation contact water	Ground contamination (e.g., PAG), surface/ground water contamination	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from ROM to Primary Crusher	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, Surface Water Management Plan	Environment	Level 2	Unlikely	D	2	L 21
143	Contact water	Ground contamination (e.g., PAG), surface/ground water contamination	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from Primary Crusher to Mill	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Surface Water Management Plan	Environment	Level 2	Unlikely	D	2	L 21
146	Exposure of tailings solids (Beach exposure)	Dust, potential acid generation, release to environment (dust), human injury	Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Third Party Review, Emergency Response Plan, Predictive Modelling, TSF Surveillance/Monitoring	Environment	Level 2	Unlikely	D	2	L 21
147	Exposure of tailings solids (Beach exposure)	Dust, potential acid generation, release to environment (dust), human injury	Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Third Party Review, Emergency Response Plan, Predictive Modelling, TSF Surveillance/Monitoring	Reputation	Level 2	Unlikely	D	2	L 21
148	Inadequate response to an emergency	Human injury, equipment damage, fire	U/G Mining Equipment - Mine Rescue Team Equipment - Emergency Response	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering (Ground Monitors), Engineering QA, PPE	Safety and Health	Level 2	Unlikely	D	2	L 21

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
149	Heavy equipment moving, more equipment on site, spill from equipment failure (mobile), accidents and equipment damage	Accidents, collisions, spills, air emissions, human injury, contact with wildlife, removal of habitat (vegetation, wetlands), generation of deleterious substances (silt and soil), fire, and waste management, dust generation	Mining - Infrastructure Development (Capital) Pre-stripping of Topsoil	Mine Plan, Wildlife Management Plan, Standard Operating Procedures; Best Management Practices, Training, Design	Environment	Level 2	Unlikely	D	2	L 21
150	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage	Dust, noise, accidents, collisions, spills, human injury, contact with wildlife, removal of habitat (vegetation, wetlands), generation of deleterious substances (silt, soil), Fire, and waste management	Mining - Infrastructure Development (Capital) - Stripping of Overburden	Mine Plan, Wildlife Management Plan, Standard Operating Procedures; Best Management Practices, Training, Design	Environment	Level 2	Unlikely	D	2	L 21
151	Failure of supply or delivery system	Loss of fresh air supply to refuge stations (potential loss of life); loss of "power" to pneumatic equipment (loss of production); human injury (equipment or line failure)	U/G Mining Infrastructure - Air and Water - Compressed Air	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Emergency Response Plan, Health and Safety Plan, PPE	Safety and Health	Level 1	Likely	C	1	L 22
152	Spills to water	Contaminants within contact water from spills	U/G Mining Infrastructure - Pump Station (Dewatering) - Pumping / Dewatering	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures	Safety and Health	Level 1	Likely	C	1	L 22
153	Spills to water	Contaminants within contact water from spills	OP Mining Infrastructure - Pump Station (Dewatering) - Pumping / Dewatering	Spill Management Plan, Engineering, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Safety and Health	Level 1	Likely	C	1	L 22
154	Spills	Loss of production, human injury, property damage, spills of process fluids, regulatory non-compliance, release to environment (groundwater contamination, soil contamination)	Utilities - Water Systems - Water Distribution System (General) - System Distribution	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Engineering (Design/Control), Health and Safety Plan, Spill Management Plan	Safety and Health	Level 1	Likely	C	1	L 22
155	Spills	Loss of production, human injury, property damage, spills of process fluids, regulatory non-compliance, release to environment (groundwater contamination, soil contamination)	Utilities - Water Systems - General Water - System Distribution	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Likely	C	1	L 22
156	Spill	Ground contamination, surface/ground water contamination, fire hazard	Primary Grinding - SAG Mill Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Environment	Level 1	Likely	C	1	L 22
157	Loss communication, Access to areas, heavy equipment moving, more equipment on site	Loss communication, congestion, accidents, collisions, spills, human injury	General Development - Site Communication & Security System - Communication	Engineering (Radio System and Phones), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Environment	Level 1	Likely	c	1	L 22
158	Loss communication, Access to areas, heavy equipment moving, more equipment on site	Loss communication, congestion, accidents, collisions, spills, human injury	General Development - Site Communication & Security System - Communication	Engineering (Radio System and Phones), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Safety and Health	Level 1	Likely	C	1	L 22
159	Blockage or breach of line	Flooding, damage of equipment, loss of production, human injury	U/G Mining Infrastructure - Underground Backfill Distribution - Backfill piping	Maintenance Procedures, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), PPE	Safety and Health	Level 1	Likely	C	1	L 22
160	Failure / inadequate communication	Human injury, equipment damage, collisions, spills, fire, loss of production	U/G Mining Infrastructure - Controls, Instrumentation and Communication - Communication (electrical)	Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Engineering (Radio System and Phones), Training, Engineering QA, PPE	Safety and Health	Level 1	Likely	C	1	L 22
161	Blockage / freezing	Spillage, human injury (burst), equipment damage, loss of production (schedule, access, cleanup)	U/G Mining Infrastructure - Backfill Piping and Distribution (Underground) - Backfill transport	Maintenance Procedures, Engineering Controls, Procedures/Training	Safety and Health	Level 1	Likely	C	1	L 22
162	Failure/breakage of pipe / delivery system (interruption of supply)	Loss of fire water; loss of production (e.g., drilling)	U/G Mining Infrastructure - Air and Water - Water Supply	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Emergency Response Plan, Health and Safety Plan, PPE	Safety and Health	Level 1	Likely	C	1	L 22
163	Inadequate design / system	Freezing of lines, loss of production, human injury, property damage, spills, regulatory non-compliance	Utilities - Water Systems - Water Distribution System (General) - System Distribution	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Likely	C	1	L 22
164	System / equipment failure (freezing, contact mechanical, electrical)	Freezing of lines, loss of production, human injury, property damage, spills	Utilities - Water Systems - Water Distribution System (General) - System Distribution	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Likely	C	1	L 22
165	Contact with lines resulting in damage (mobile equipment, human)	Spills, flooding, loss of production, human injury, property damage	Utilities - Water Systems - Water Distribution System (General) - System Distribution	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Likely	C	1	L 22
167	Inadequate design and/or maintenance	Loss of production, property damage, human injury	Utilities - Power & Electrical - Lightning Protection Design and Maintenance	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures	Safety and Health	Level 2	Rare	E	2	L 23
168	Inadequate design and/or maintenance	Loss of production, property damage, human injury	Utilities - Power & Electrical - Lightning Protection Design and Maintenance	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control)	Reputation	Level 2	Rare	E	2	L 23
177	Poor location	Noise, air quality (outtake), public complaints from visibility, air quality (intake)	Mining Underground - Ventilation Shafts - Design of Shaft	Engineering, Engineering QA, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training, Maintenance Procedures	Environment	Level 2	Rare	E	2	L 23

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
183	Collision with lime silo	Equipment damage, loss of production, spill of lime	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from Primary Crusher to Mill	Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE	Environment	Level 2	Rare	E	2	L 23
184	Collision with bins / silos	Human injury, ground contamination, groundwater contamination, equipment damage	Paste Plant and Distribution - Plant Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA, Shut-down Procedures, Traffic Management Plan	Environment	Level 2	Rare	E	2	L 23
187	Natural gas leak	Human injury, explosion, fire, and loss of production, damage of equipment	U/G Mining Infrastructure - Mine Heating - Heating	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Emergency Response Plan, Engineering, Engineering QA, Training	Environment	Level 2	Rare	E	2	L 23
190	Failure / damage of equipment / insufficient warning of hazards	Human Injury, equipment damage, poor air quality, ground collapse	U/G Mining Equipment - Ancillary equipment (survey etc.) - Monitoring equipment (Ground control, Air Quality and Seismic)	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering (Ground Monitors), Engineering QA, PPE, Spill Management Plan	Safety and Health	Level 2	Rare	E	2	L 23
191	Failure / damage of equipment / insufficient warning of hazards	Human injury, equipment damage, poor air quality, ground collapse	OP Mining Equipment - Ancillary equipment (survey etc.) - Failure of seismic Sensor	Emergency Response Plan, Engineering (Ground Control Equipment)	Safety and Health	Level 2	Rare	E	2	L 23
192	Overflow of spillway	Human injury, damage to property, spill, release to environment, contamination to groundwater and surface water, loss of production, cost, regulatory non-compliance, damage to property (Treasury), damaged to surrounding environment, deputation	Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Third Party Review, Emergency Response Plan, Predictive Modelling, TSF Surveillance/Monitoring, Groundwater Monitoring	Environment	Level 2	Rare	E	2	L 23
193	Overflow of spillway	Human injury, damage to property, spill, release to environment, contamination to groundwater and surface water, loss of production, cost, regulatory non-compliance, damage to property (Treasury), damaged to surrounding environment, deputation	Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Third Party Review, Emergency Response Plan, Predictive Modelling, TSF Surveillance/Monitoring, Groundwater Monitoring	Reputation	Level 2	Rare	E	2	L 23
194	Drowning	Human injury, reputation	Maintenance / Inspection	Standard Operating Procedures; Best Management Practices, PPE, Engineering (Design/Control/QA/QC)	Reputation	Level 2	Rare	E	2	L 23
195	Collision with conductors or towers	Structural damage, potential power interruption, human injury	Offsite Infrastructure - Offsite Power Transmission Construction/Operational Activity in proximity to line	Standard Operating Procedures; Best Management Practices, Training, Emergency Response Plan	Reputation	Level 2	Rare	E	2	L 23
196	Improper procedure; equipment failure	Production of HCN	Process Reagents -Preparation	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design), Health and Safety Plan, PPE, Spill Management Plan	Environment	Level 2	Rare	E	2	L 23
197	Mechanical / instrumentation failure	Off-gassing of HCN, loss of production, fire (e.g., agitator motors)	CIL - CIL Operation	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Spill Management Plan	Environment	Level 2	Rare	E	2	L 23
206	Collision with lime silo	Equipment damage, loss of production, spill of lime	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from Primary Crusher to Mill	Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE	Safety and Health	Level 2	Rare	E	2	L 23
207	Collisions (human, vehicle, infrastructure)	Human injury, equipment damage, loss of production, fire, spills	Mill Feed and Storage - SAG Mill Feed Stock Pile Operation of Mobile Equipment at Dead Stock Pile	Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE	Safety and Health	Level 2	Rare	E	2	L 23
208	Contact with wildlife, access for public, access to equipment, threat to security	Human injury, attraction of wildlife, theft, access to equipment /explosives	General Development - Fencing/Gates (Site Control) - Installing and Operation of fencing and gate	Engineering (Fence and Gates), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan	Reputation	Level 1	Unlikely	D	1	L 24
209	Access for public / staff, access to equipment, threat to security, safety	Unwanted access by unauthorized persons to site or areas of the plant, human injury, access to equipment /explosives, damage to equipment and sampling locations	General Development - Fencing/Gates (Site Control), Access to mine site and remote sampling locations (on and off property)	Engineering (CC-TV, Fence and Gates), Health and Safety Plan, Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan	Reputation	Level 1	Unlikely	D	1	L 24
210	Inadequate maintenance	Regulatory non-compliance, human injury, property damage, spills, fire	Utilities - Water Systems - Fire Water - Maintenance	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Unlikely	D	1	L 24

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
211	Failure of backfill barricade	Flooding, damage of equipment, loss of production, human injury	U/G Mining Infrastructure - Underground Backfill Distribution - Backfill	Maintenance Procedures, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Training, Engineering QA, PPE.	Safety and Health	Level 1	Unlikely	D	1	L 24
212	Equipment / operator failure	Molten metal spill (human injury; equipment damage; loss of production), fire	Smelting Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Shut-down Procedures Design.	Reputation	Level 1	Unlikely	D	1	L 24
213	Downed line (from contact or accident (weather event))	Loss of production, loss of safety infrastructure, property damage, human injury, electrocution	Utilities - Power & Electrical - Power Distribution - Power Operations	Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Safety and Health	Level 1	Unlikely	D	1	L 24
214	Vehicle accidents / collisions with other equipment / snow removal	Vehicle Congestion / traffic, human injury, fire, spills, equipment damage, animal contact	U/G Mining Infrastructure - Portal Infrastructure Transportation	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Training	Environment	Level 1	Unlikely	D	1	L 24
215	Collision (vehicle)	Spillage, human injury (burst), equipment damage, loss of production (schedule, access, cleanup)	U/G Mining Infrastructure - Backfill Piping and Distribution (Underground) - Backfill transport	Wildlife Management Plan Standard Operating Procedures; Best Management Practices, Traffic Management Plan, Spill Management Plan, Health and Safety Plan, Engineering, Engineering QA, Training	Safety and Health	Level 1	Unlikely	D	1	L 24
216	Spill from fueling heavy equipment (fueling of drills, loaders, trucks)	Spills when filling fuel truck, spills from filling equipment, spills from fuel truck (maintenance)	U/G Mining Infrastructure - U/G Fuel Distribution Fueling of set Heavy Equipment	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Design	Environment	Level 1	Unlikely	D	1	L 24
217	Fire / explosion	Spills when filling fuel truck, human injury, fire, equipment damage	U/G Mining Infrastructure - U/G Fuel Distribution Fueling of set Heavy Equipment	Emergency Response Plan, Spill Management Plan, Standard Operating Procedures; Best Management Practices, Design	Environment	Level 1	Unlikely	D	1	L 24
218	Blasting, heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, Rock Fall	Flying debris, dust, noise, accidents, collisions, spills, human injury, generation of deleterious substances (silt, soil and nitrates and NH3, NH4), fire, and waste management, rock fall (from truck or wall)	Mining - Infrastructure Development (Capital) - Mining the Resource	Mine Plan, Standard Operating Procedures; Best Management Practices, Training, Design Engineering (Ground Movement Sensors)	Environment	Level 1	Unlikely	D	1	L 24
219	Spill from fueling heavy equipment (fueling of drills, loaders, trucks)	Spills when filling fuel truck, spills from filling equipment, spills from fuel truck (maintenance)	OP Mining Infrastructure - OP Fuel Storage and Distribution Fueling of Heavy Equipment	Spill Management Plan, Engineering, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Environment	Level 1	Unlikely	D	1	L 24
220	Fire / explosion	Spills when filling fuel truck, human injury, fire, equipment damage	OP Mining Infrastructure - OP Fuel Storage and Distribution Fueling of Heavy Equipment	Spill Management Plan, Engineering, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Environment	Level 1	Unlikely	D	1	L 24
221	Dust	Alteration of air quality (atmospheric and human effects), particulate deposition outside of mine area	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from ROM to Primary Crusher	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan	Safety and Health	Level 1	Unlikely	D	1	L 24
222	Dust	Alteration of air quality (atmospheric and human effects), particulate deposition outside of mine area	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from Primary Crusher to Mill (including Lime Silo)	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE	Safety and Health	Level 1	Unlikely	D	1	L 24
223	Dust	Alteration of air quality (atmospheric and human effects), particulate deposition outside of mine area	Paste Plant and Distribution - Plant Operation area	Fugitive Dust Management Plan Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Separation, Spill Management Plan, Engineering (Design), Engineering QA, Shut-down Procedures	Safety and Health	Level 1	Unlikely	D	1	L 24
224	Power failure	Loss of production, loss of safety infrastructure, property damage, flooding (underground and open pit)	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Power operations	Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA	Safety and Health	Level 1	Unlikely	D	1	L 24
225	Spills	Discharge to environment, property damage	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Operation	Standard Operating Procedures; Best Management Practices, Spill Response Plan, Maintenance Procedures, Engineering	Environment	Level 1	Unlikely	D	1	L 24
226	Power failure	Loss of production, loss of safety infrastructure, property damage, flooding (underground and open pit)	Utilities - Power & Electrical - Power Distribution - Power operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training, PPE	Safety and Health	Level 1	Unlikely	D	1	L 24
229	Power failure	Loss of production, loss of safety infrastructure, property damage, flooding (underground and open pit)	Utilities - Power & Electrical - Emergency Power - Emergency Power operations	Design, Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Safety and Health	Level 1	Unlikely	D	1	L 24
230	Spill	Release to environment, human injury, property damage, human injury, air pollution	Utilities - Fuel, Storage, & Distribution - Diesel - Fuel transfer, Storage, Fueling of Diesel	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Environment	Level 1	Unlikely	D	1	L 24

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
231	Fire / explosion / spills / tank failure / hose failure / nozzle failure	Release to environment, human injury, property damage, human injury, air pollution, fire	Utilities - Fuel, Storage, & Distribution - Gasoline - Restocking, Storage, Fueling of Gasoline	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Environment	Level 1	Unlikely	D	1	L 24
232	Spill	Release to environment, human injury, property damage, human injury, air pollution	Restocking, Storage, Fueling of Gasoline	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Environment	Level 1	Unlikely	D	1	L 24
233	Spills / tank failure / hose failure / nozzle failure	Spill human injury, property damage	Utilities - Fuel, Storage, & Distribution - Oil and Grease - Restocking, Storage, Use of Oil and Greases	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Environment	Level 1	Unlikely	D	1	L 24
234	Fire	Release to environment, human injury, property damage, human injury, air pollution	Restocking, Storage, Use of Oil and Greases	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Environment	Level 1	Unlikely	D	1	L 24
235	Spills / tank failure / hose failure / nozzle failure	Spill human injury, property damage	Utilities - Fuel, Storage, & Distribution - Waste Oil Disposal - Temporary Storage of waste	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Environment	Level 1	Unlikely	D	1	L 24
236	Fire	Release to environment, human injury, property damage, human injury, air pollution	Utilities - Fuel, Storage, & Distribution - Waste Oil Disposal - Temporary Storage of waste	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Environment	Level 1	Unlikely	D	1	L 24
237	Fire	Human injury, fire, property damage, regulatory non-compliance	Storage of Waste	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan	Environment	Level 1	Unlikely	D	1	L 24
238	Spill	Release to environment, human injury, property damage, human injury, air pollution	Hazardous waste	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Spill Management Plan, Design	Environment	Level 1	Unlikely	D	1	L 24
239	Spills, splashes	Release to environment, human injury, property damage, human injury, air pollution	Utilities - Waste Disposal - Sewage Storage - Operations / Storage / Handling	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Spill Management Plan, Design	Environment	Level 1	Unlikely	D	1	L 24
240	Process failure (CN destruction unit failure)	CN Release to environment, harm to animals (birds), regulatory non-compliance, loss of production, cost, reputation	Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Training, Emergency Response Plan, PPE	Reputation	Level 1	Unlikely	D	1	L 24
241	Loss of lighting, attraction of animals	Loss of yard lighting, light pollution, reduction of visibility, congestion, accidents, attraction of animals, human injury	General Development - Yard Lighting - Yard Lighting	Engineering, Health and Safety Plan, Wildlife Management Plan, Standard Operating Procedures; Best Management Practices	Environment	Level 1	Unlikely	D	1	L 24
248	Dust	Alteration of air quality (atmospheric and human effects), particulate deposition outside of mine area	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from ROM to Primary Crusher	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, Fugitive Dust Management Plan	Environment	Level 1	Unlikely	D	1	L 24
249	Dust	Alteration of air quality (atmospheric and human effects), particulate deposition outside of mine area	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from Primary Crusher to Mill (including Lime Silo)	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Fugitive Dust Management Plan	Environment	Level 1	Unlikely	D	1	L 24
250	Dust	Alteration of air quality (atmospheric and human effects), particulate deposition outside of mine area	Paste Plant and Distribution - Plant Operation area	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Separation, Spill Management Plan, Engineering (Design), Engineering QA, Shut-down Procedures, Fugitive Dust Management Plan	Environment	Level 1	Unlikely	D	1	L 24
254	Inadequate design	Loss of light, safety, property damage, human injury	Utilities - Power & Electrical - Area Lighting - Emergency Lighting	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan	Environment	Level 1	Unlikely	D	1	L 24
255	Inadequate maintenance	Loss of light, safety, property damage, human injury	Utilities - Power & Electrical - Area Lighting - Emergency Lighting	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan	Environment	Level 1	Unlikely	D	1	L 24
256	Line breach / rupture / spill	Spill, release to environment, contamination to groundwater and surface water, loss of production, cost, regulatory non-compliance, frozen line, human injury, damage to property	Tailings - Tailing Delivery System / Reclaim Water Operations of Pipeline	Standard Operating Procedures; Best Management Practices, Emergency Response Plan, Design, Engineering QA	Safety and Health	Level 1	Unlikely	D	1	L 24
257	Line breach / rupture / spill	Spill, release to environment, contamination to groundwater and surface water, loss of production, cost, regulatory non-compliance, frozen line, human injury, damage to property	Tailings - Tailing Delivery System / Reclaim Water Operations of Pipeline	Standard Operating Procedures; Best Management Practices, Emergency Response Plan, Design, Engineering QA	Environment	Level 1	Unlikely	D	1	L 24
260	Mechanical / electrical failure	Backflow of tailings, loss of production, cost, contained spill	Tailings - Tailing Delivery System / Reclaim Water Operation of Pipeline	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Emergency Response Plan, Engineering QA	Safety and Health	Level 1	Unlikely	D	1	L 24
261	Mechanical / electrical failure	Backflow of tailings, loss of production, cost, contained spill	Tailings - Tailing Delivery System / Reclaim Water Operation of Pipeline	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Emergency Response Plan, Engineering QA	Environment	Level 1	Unlikely	D	1	L 24

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
264	Spills	Ground contamination, surface/ground water contamination, fire hazard	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from ROM to Primary Crusher	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Spill Management Plan	Safety and Health	Level 1	Unlikely	D	1	L 24
265	Spills	Ground contamination, surface/ground water contamination, fire hazard	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from ROM to Primary Crusher	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Spill Management Plan	Environment	Level 1	Unlikely	D	1	L 24
266	Spills	Ground contamination, surface/ground water contamination, fire hazard, rock fall (human/equipment impacts)	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from Primary Crusher to Mill	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE	Safety and Health	Level 1	Unlikely	D	1	L 24
267	Spills	Ground contamination, surface/ground water contamination, fire hazard, rock fall (human/equipment impacts)	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from Primary Crusher to Mill	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE	Environment	Level 1	Unlikely	D	1	L 24
268	Equipment failure (including power supply)	Damage, human injury, fire, spill, loss of production	Mill Feed and Storage - SAG Mill Feed Stock Pile General equipment operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE	Safety and Health	Level 1	Unlikely	D	1	L 24
269	Equipment failure (including power supply)	Damage, human injury, fire, spill, loss of production	Mill Feed and Storage - SAG Mill Feed Stock Pile General equipment operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE	Environment	Level 1	Unlikely	D	1	L 24
271	Improper procedures and general maintenance (e.g., during charging and relining)	Human injury, equipment damage, loss of production	Primary Grinding - SAG Mill Maintenance	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Environment	Level 1	Unlikely	D	1	L 24
273	Improper operation and maintenance	Human injury, equipment damage, loss of production	Primary Grinding -Overhead Crane	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Environment	Level 1	Unlikely	D	1	L 24
276	Scrubber malfunction	Steam / chemical / particulate release (Cl, steam, etc.), human injury, damage, loss of production), ground contamination	Carbon Regeneration - Operation of horizontal kiln	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Shut-down Procedures, Engineering (Design), Engineering QA, Health and Safety Plan, PPE, Spill Management Plan	Environment	Level 1	Unlikely	D	1	L 24
278	Burner malfunction	Fire, explosion, human injury, equipment damage, loss of production	Carbon Regeneration - Operation of horizontal kiln	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Emergency Response Plan, Engineering (Design), Engineering QA, Health and Safety Plan, PPE, Spill Management Plan	Environment	Level 1	Unlikely	D	1	L 24
280	General equipment malfunction	Spills, steam release, ground contamination	Carbon Regeneration - Operation of horizontal kiln	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Shut-down Procedures, Engineering (Design), Engineering QA, PPE, Spill Management Plan	Environment	Level 1	Unlikely	D	1	L 24
282	Improper operation and maintenance	Human injury, equipment damage, loss of production	Overhead Crane	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Government Regulation and Log Book	Environment	Level 1	Unlikely	D	1	L 24
284	Failure of scrubber	Gaseous release into environment (human injury, air quality)	Generation of gas by-products	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Shut-down Procedures	Environment	Level 1	Unlikely	D	1	L 24
285	Failure of scrubber	Gaseous release into environment (human injury, air quality)	Generation of gas by-products	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Shut-down Procedures	Reputation	Level 1	Unlikely	D	1	L 24
286	Failure of air quality control measures	Environmental release; human injury	Smelting Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Shut-down Procedures	Environment	Level 1	Unlikely	D	1	L 24

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
287	Failure of air quality control measures	Environmental release, human injury	Smelting Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Shut-down Procedures	Reputation	Level 1	Unlikely	D	1	L 24
288	Improper equipment maintenance and operation	Human injury, ground contamination, groundwater contamination, equipment damage, fire	Paste Plant and Distribution - Plant Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA	Environment	Level 1	Unlikely	D	1	L 24
292	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, communication with haul trucks	Air emissions, dust, noise, accidents, collisions (vehicle, wildlife, livestock), fire, spills, human injury	Offsite Infrastructure - Offsite Access Road - Transportation - Heavy equipment	Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training, Wildlife Management Plan, Emergency Response Plan, Spill Management Plan	Reputation	Level 1	Unlikely	D	1	L 24
294	Insufficient drainage, habitat alteration	Habitat damage, flooding, road washout	General Development - Site Roads - Development of Road Crossing (culverts)	Standard Operating Procedures; Best Management Practices, Training, Traffic Management Plan, Surface Water Management Plan, Engineering QA/QC	Safety and Health	Level 1	Unlikely	D	1	L 24
296	Failure / inadequate communication	Human injury, equipment damage, collisions, spills, fire, loss of production	U/G Mining Infrastructure - Controls, Instrumentation and Communication - Communication (electrical)	Traffic Management Plan, Standard Operating Procedures; Best Management Practices, Engineering (Radio System and Phones), Training, Engineering QA, PPE	Environment	Level 1	Unlikely	D	1	L 24
298	Uncontrolled release of site water, increase of the volume of water down stream (temporary increase)	Uncontrolled water release, release of deleterious substances (silt and soil), increase in volume; effect to down stream water quality / quantity; removal of habitat (FISH RELOCATION?)	General Development - Site Drainage - Dewatering of site (Surface water changes with ponds and General Arrangement area)	Water Management Plan, Engineering (Design), Standard Operating Procedures; Best Management Practices, Training, Spill Management Plan, Regulatory Permits	Safety and Health	Level 1	Unlikely	D	1	L 24
299	Spill	Ground contamination, surface/ground water contamination, fire hazard	Primary Grinding - SAG Mill Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Safety and Health	Level 1	Unlikely	D	1	L 24
300	Improper procedures and general maintenance (e.g., during charging and relining)	Human injury, equipment damage, loss of production	Primary Grinding - SAG Mill Maintenance	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Safety and Health	Level 1	Unlikely	D	1	L 24
301	Use of HCl	Spill / spray / release (injury, damage, loss of production)	Acid Wash and Elution - Acid Washing Operations	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design Spray Guards), Health and Safety Plan, PPE, Spill Management Plan	Safety and Health	Level 1	Unlikely	D	1	L 24
302	Equipment failure	Spill / spray / release (injury, damage, loss of production)	Acid Wash and Elution - Acid Washing Operations	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design Spray Guards), Health and Safety Plan, PPE, Spill Management Plan	Safety and Health	Level 1	Unlikely	D	1	L 24
304	Scrubber malfunction	Steam / chemical / particulate release (Cl, steam, etc.), human injury, damage, loss of production), ground contamination	Carbon Regeneration - Operation of horizontal kiln	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Shut-down Procedures, Engineering (Design), Engineering QA, Health and Safety Plan, PPE, Spill Management Plan	Safety and Health	Level 1	Unlikely	D	1	L 24
305	General equipment malfunction	Spills, steam release, ground contamination	Carbon Regeneration - Operation of horizontal kiln	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Shut-down Procedures, Engineering (Design), Engineering QA, PPE, Spill Management Plan	Safety and Health	Level 1	Unlikely	D	1	L 24
306	Failure of scrubber	Gaseous release into environment (human injury, air quality)	Generation of gas by-products	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Shut-down Procedures	Safety and Health	Level 1	Unlikely	D	1	L 24
307	Failure of air quality control measures	Environmental release, human injury	Smelting Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Shut-down Procedures	Safety and Health	Level 1	Unlikely	D	1	L 24
308	Improper equipment maintenance and operation	Human injury, ground contamination, groundwater contamination, equipment damage, fire	Paste Plant and Distribution - Plant Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA	Safety and Health	Level 1	Unlikely	D	1	L 24

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
309	Spills	Discharge to environment, property damage	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Operation	Standard Operating Procedures; Best Management Practices, Spill Response Plan, Maintenance Procedures, Engineering	Safety and Health	Level 1	Unlikely	D	1	L 24
310	Fire / explosion / spills / tank failure / hose failure / nozzle failure	Release to environment, human injury, property damage, human injury, air pollution, fire	Utilities - Fuel, Storage, & Distribution - Diesel - Fuel transfer, Storage, Fueling of Diesel	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Environment	Level 1	Unlikely	D	1	L 24
311	Inadequate maintenance	Loss of water, freezing of lines, loss of production, human injury, property damage, spills	Utilities - Water Systems - Water Distribution System (General) -Maintenance	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Unlikely	D	1	L 24
312	Inadequate design /system	Freezing of lines, loss of production, human injury, property damage, spills, regulatory non-compliance	Utilities - Water Systems - General Water - System Distribution	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Unlikely	D	1	L 24
313	System / equipment failure (freezing, contact, mechanical, electrical)	Freezing of lines, loss of production, human injury, property damage, spills	Utilities - Water Systems - General Water - System Distribution	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Unlikely	D	1	L 24
314	Contact with lines resulting in damage (mobile equipment, human)	Spills, flooding, loss of production, human injury, property damage	Utilities - Water Systems - General Water - System Distribution	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Unlikely	D	1	L 24
315	Inadequate maintenance	Loss of water, freezing of lines, loss of production, human injury, property damage, spills	Utilities - Water Systems - General Water - Maintenance	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Unlikely	D	1	L 24
316	Process failure (CN destruction unit failure)	CN Release to environment, harm to animals (birds), regulatory non-compliance, loss of production, cost, reputation	Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Training, Emergency Response Plan, PPE	Safety and Health	Level 1	Unlikely	D	1	L 24
317	Process failure (CN destruction unit failure)	CN Release to environment, harm to animals (birds), regulatory non-compliance, loss of production, cost, reputation	Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Training, Emergency Response Plan, PPE	Environment	Level 1	Unlikely	D	1	L 24
318	Exposure of tailings solids (Beach exposure)	Dust, potential acid generation, release to environment (dust), human injury	Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Third Party Review, Emergency Response Plan, Predictive Modelling, TSF Surveillance/Monitoring	Safety and Health	Level 1	Unlikely	D	1	L 24
319	Alarm failure	Human injury, damage to property, air quality, threat to surrounding areas and properties	General Development - Site Evacuation Alarm Systems - Evacuation Systems operation	Emergency Response Plan (Provincial Fire Protection), Emergency Shutdown Procedures, Engineering (Radio System and Phones), Health and Safety Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Reputation	Level 1	Rare	E	1	L 25
320	Slow reaction to evacuation	Human injury, damage to property, air quality, threat to surrounding areas and properties	General Development - Site Evacuation Alarm Systems -Fire Systems operation	Emergency Response Plan (Provincial Fire Protection), Emergency Shutdown Procedures, Engineering (Radio System and Phones), Health and Safety Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Reputation	Level 1	Rare	E	1	L 25
321	Alarm failure	Human injury, damage to property, air quality, threat to surrounding areas and properties	General Development - Site Evacuation Alarm Systems - Evacuation Systems operation	Emergency Response Plan (Provincial Fire Protection), Emergency Shutdown Procedures, Engineering (Radio System and Phones), Health and Safety Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Safety and Health	Level 1	Rare	E	1	L 25
322	Slow reaction to evacuation	Human injury, damage to property, air quality, threat to surrounding areas and properties	General Development - Site Evacuation Alarm Systems -Fire Systems operation	Emergency Response Plan (Provincial Fire Protection), Emergency Shutdown Procedures, Engineering (Radio System and Phones), Health and Safety Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Safety and Health	Level 1	Rare	E	1	L 25
323	Explosions, fire	Explosions, fire, human injury, collisions, accidents, damage to property	U/G Mining Equipment - Mobile Equipment - Explosive Mixing truck	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Spill Management Plan, Regulatory Permits	Reputation	Level 1	Rare	E	1	L 25
324	Fire, spills, explosions	Human injury, equipment damage, Fire, mine shut-down, spills, explosions	U/G Mining Infrastructure - Underground Workshop (and/or Service Bay) - Maintenance	Explosives Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures, PPE	Reputation	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
325	Explosion / fire	Fire, damage, human injury, air quality, mine shut-down	U/G Mining Infrastructure - Underground Explosive Magazine - Storage / Handling	Explosives Management Plan, Emergency Response Plan, Regulatory Permits, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures, PPE	Reputation	Level 1	Rare	E	1	L 25
326	Improper handling / storage / disposal	Equipment damage, human injury, spills	U/G Mining Infrastructure - Underground Explosive Magazine - Storage / Handling	Emergency Response Plan, Explosives Management Plan, Standard Operating Procedures; Best Management Practices, Engineering QA, Environmental Permits	Reputation	Level 1	Rare	E	1	L 25
327	Uncontrolled blast	Human injury, equipment damage, spills, fire, loss of production	U/G Mining Infrastructure - Controls, Instrumentation and Communication -Blasting Control	Explosives Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering, Training, Engineering QA, PPE	Reputation	Level 1	Rare	E	1	L 25
328	Failure of supply or delivery system	Loss of fresh air supply to refuge stations (potential loss of life); loss of "power" to pneumatic equipment (loss of production); human injury (equipment or line failure)	U/G Mining Infrastructure - Air and Water - Compressed Air	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Emergency Response Plan, Health and Safety Plan, PPE	Reputation	Level 1	Rare	E	1	L 25
329	Breakeage of pipe / delivery system	Loss of fresh air supply to refuge stations (potential loss of life); loss of "power" to pneumatic equipment (loss of production); human injury (equipment or line failure)	U/G Mining Infrastructure - Air and Water - Compressed Air	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Emergency Response Plan, Health and Safety Plan, PPE	Reputation	Level 1	Rare	E	1	L 25
330	Explosions, fire	Explosions, fire, human injury, collisions, accidents, damage to property	OP Mining Equipment - Mobile Equipment - Transportation - Movement of Staff and Maintenance vehicles - Explosive Mixing truck	Explosives Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training, Engineering QA, Regulatory Permits	Reputation	Level 1	Rare	E	1	L 25
331	Explosion / fire	Fire, damage, human injury, air quality, mine shut-down	OP Mining Infrastructure - Explosive Magazine - Storage / Handling	Emergency Response Plan, Explosives Management Plan, Security System, Standard Operating Procedures; Best Management Practices, Regulatory Permits	Reputation	Level 1	Rare	E	1	L 25
332	Improper handling / storage / disposal	Equipment damage, human injury, spills	OP Mining Infrastructure - Explosive Magazine - Storage / Handling	Emergency Response Plan, Explosives Management Plan, Spill Management Plan, Security System, Standard Operating Procedures; Best Management Practices, Regulatory Permits	Reputation	Level 1	Rare	E	1	L 25
333	Expiry of equipment (wear or shelf life)	Unfit equipment, use of damaged equipment, improper waste management	OP Mining Infrastructure - Safety Equipment, Lamps etc. and Storage -Safety Equipment	Health and Safety Plan, Maintenance Procedures, Standard Operating Procedures; Best Management Practices, PPE	Safety and Health	Level 1	Rare	E	1	L 25
334	Fire, spills, explosions	Human injury, equipment damage, Fire, mine shut-down, spills, explosions	Ancillary Facilities - Truck Shop and Maintenance Shop - Maintenance	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Emergency Response Plan, Explosives Management Plan, Engineering QA, Regulatory Permits	Reputation	Level 1	Rare	E	1	L 25
335	Fire	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Temporary Facilities - Construction Laydown Area Operation of Laydown Area	Standard Operating Procedures; Best Management Practices, Emergency Response Plan, Traffic Management Plan, Spill Management Plan, Engineering (Design/Control/QA/QC)	Reputation	Level 1	Rare	E	1	L 25
336	Material release / spill / splash / fumes / gas generation	Human injury, equipment damage, loss of production, release to environment	Process Reagents -Storage/Distribution	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design), Health and Safety Plan, PPE, Spill Management Plan	Reputation	Level 1	Rare	E	1	L 25
337	Use of CN solution	Spill / spray / release (injury, damage, loss of production)	Acid Wash and Elution - Elution Operations	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design Spray Guards), Health and Safety Plan, PPE, Spill Management Plan	Reputation	Level 1	Rare	E	1	L 25
338	Equipment failure	Spill / spray / release (injury, damage, loss of production), fire, flying debris	Acid Wash and Elution - Elution Operations	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design Spray Guards), Health and Safety Plan, PPE, Spill Management Plan	Reputation	Level 1	Rare	E	1	L 25
339	Falls	Human injury, reputation, equipment damage / loss of equipment	Mining Underground - Vertical Development - Development	Engineering, Engineering QA, Spill Management Plan, Standard Operating Procedures; Best Management Practices, Training	Reputation	Level 1	Rare	E	1	L 25
340	Falls	Human injury, equipment damage	U/G Mining Equipment - Fixed Equipment - Gates and Chutes	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering, Engineering QA, PPE, Air Monitors	Reputation	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
341	Failure of backfill barricade	Flooding, damage of equipment, loss of production, human injury	U/G Mining Infrastructure - Underground Backfill Distribution - Backfill	Maintenance Procedures, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Training, Engineering QA, PPE	Reputation	Level 1	Rare	E	1	L 25
342	Structural failure / inadequate capacity	Human Injury, Inadequate Ventilation, equipment damage, Instable ground, loss of egress, damage to reputation	U/G Mining Infrastructure - Portal Infrastructure Structure of Portal	Design, Standard Operating Procedures; Best Management Practices, Engineering QA, Emergency Response Plan	Reputation	Level 1	Rare	E	1	L 25
343	Natural gas leak	Human injury, explosion, fire, and loss of production, damage of equipment	U/G Mining Infrastructure - Mine Heating - Heating	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Emergency Response Plan, Engineering, Engineering QA, Training	Reputation	Level 1	Rare	E	1	L 25
344	Fire / explosion	Spills when filling fuel truck, human injury, fire, equipment damage	U/G Mining Infrastructure - U/G Fuel Distribution Fueling of set Heavy Equipment	Emergency Response Plan, Spill Management Plan, Standard Operating Procedures; Best Management Practices, Design	Reputation	Level 1	Rare	E	1	L 25
345	Blasting, heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, rock fall	Flying debris, dust, noise, accidents, collisions, spills, human injury, generation of deleterious substances (silt, soil and nitrates and NH3, NH4), fire, and waste management, rock fall (from truck or wall)	Mining - Infrastructure Development (Capital) - Mining the Resource	Mine Plan, Standard Operating Procedures; Best Management Practices, Training, Design Engineering (Ground Movement Sensors)	Reputation	Level 1	Rare	E	1	L 25
346	Expiry of equipment (wear or shelf life)	Unfit equipment, use of damaged equipment, improper waste management	OP Mining Infrastructure - Safety Equipment, Lamps etc. and Storage -Safety Equipment	Health and Safety Plan, Maintenance Procedures, Standard Operating Procedures; Best Management Practices, PPE	Reputation	Level 1	Rare	E	1	L 25
347	Fire / explosion	Spills when filling fuel truck, human injury, fire, equipment damage	OP Mining Infrastructure - OP Fuel Storage and Distribution Fueling of Heavy Equipment	Spill Management Plan, Engineering, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Reputation	Level 1	Rare	E	1	L 25
348	Contact with equipment (snow removal / grading)	Property damage, human injury, electrocution	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Maintenance	Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA	Reputation	Level 1	Rare	E	1	L 25
349	Back-feeding from emergency power	Property damage, damage to equipment, loss of production, human injury, electrocution	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Operation	Standard Operating Procedures; Best Management Practices, Engineering, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
350	Protection failures	Property damage, damage to equipment, human injury, electrocution	Utilities - Power & Electrical - HV Switchyard and Substation (General) - Operation	Standard Operating Procedures; Best Management Practices, Engineering	Reputation	Level 1	Rare	E	1	L 25
351	Fire / explosion	Property damage, human injury, air pollution, release of fuel to air, or environment (-45 or less)	Utilities - Fuel, Storage, & Distribution - Propane - Propane Use	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
352	Fire / explosion	Property damage, human injury, air pollution, release of fuel to air	Utilities - Fuel, Storage, & Distribution - Natural Gas - Natural Gas Use	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
353	Contact with property resulting in damage (mobile equipment, human)	Loss of production, human injury, damage to property, release to the air, fire, explosion	Utilities - Fuel, Storage, & Distribution - Propane - Propane Fork Lifts	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
354	Contact with lines resulting in damage (mobile equipment, human)	Loss of production, human injury, damage to property, release to the air, fire, explosion	Utilities - Fuel, Storage, & Distribution - Natural Gas -Natural Gas	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
355	Fire / explosion / spills / tank failure / hose failure / nozzle failure	Release to environment, human injury, property damage, human injury, air pollution, fire	Utilities - Fuel, Storage, & Distribution - Gasoline - Restocking, Storage, Fueling of Gasoline	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
356	Spills / tank failure / hose failure / nozzle failure	Spill human injury, property damage	Utilities - Fuel, Storage, & Distribution - Oil and Grease - Restocking, Storage, Use of Oil and Greases	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Reputation	Level 1	Rare	E	1	L 25
357	Spills / tank failure / hose failure / nozzle failure	Spill human injury, property damage	Utilities - Fuel, Storage, & Distribution - Waste Oil Disposal - Temporary Storage of waste	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Reputation	Level 1	Rare	E	1	L 25
358	Inadequate maintenance	Regulatory non-compliance, human injury, property damage, spills, fire	Utilities - Water Systems - Fire Water - Maintenance	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
359	Loss of power	Fire, spills, loss of power, equipment damage, damage to property, human injury	Utilities - Water Systems - Fire Water -Use of Fire water	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Emergency Response Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
364	Explosions, fire	Explosions, fire, human injury, collisions, accidents, damage to property	U/G Mining Equipment - Mobile Equipment - Explosive Mixing truck	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Spill Management Plan, Regulatory Permits	Safety and Health	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
365	Fire, spills, explosions	Human injury, equipment damage, Fire, mine shut-down, spills, explosions	U/G Mining Infrastructure - Underground Workshop (and/or Service Bay) - Maintenance	Explosives Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures, PPE	Safety and Health	Level 1	Rare	E	1	L 25
366	Improper handling / storage / disposal	Equipment damage, human injury, spills	U/G Mining Infrastructure - Underground Explosive Magazine - Storage / Handling	Emergency Response Plan, Explosives Management Plan, Standard Operating Procedures; Best Management Practices, Engineering QA, Environmental Permits	Safety and Health	Level 1	Rare	E	1	L 25
367	Inadequate location of emergency refuge chambers	Human injury, slow return to stations	U/G Mining Infrastructure - Mobile Refuge Chambers - Location of Refuge Chambers	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), PPE	Safety and Health	Level 1	Rare	E	1	L 25
368	Inadequate location of emergency refuge chambers	Human injury, slow return to stations	U/G Mining Infrastructure - Mobile Refuge Chambers - Location of Refuge Chambers	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), PPE	Reputation	Level 1	Rare	E	1	L 25
369	Inadequate design / supply emergency refuge chambers	Human injury, limited supplies for capacity	U/G Mining Infrastructure - Mobile Refuge Chambers - Capacity / Supplies of Refuge Chambers	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), PPE	Safety and Health	Level 1	Rare	E	1	L 25
370	Inadequate design / supply emergency refuge chambers	Human injury, limited supplies for capacity	U/G Mining Infrastructure - Mobile Refuge Chambers - Capacity / Supplies of Refuge Chambers	Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), PPE	Reputation	Level 1	Rare	E	1	L 25
371	Uncontrolled blast	Human injury, equipment damage, spills, fire, loss of production	U/G Mining Infrastructure - Controls, Instrumentation and Communication -Blasting Control	Explosives Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering, Training, Engineering QA, PPE	Safety and Health	Level 1	Rare	E	1	L 25
372	Inadequate condition of safety equipment	Failure of safety equipment, human injury	U/G Mining Infrastructure - Safety Equipment, Lamps etc. and Storage - Maintenance of Safety Equipment	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Health and Safety Plan, PPE	Safety and Health	Level 1	Rare	E	1	L 25
373	Expiry of equipment (wear or shelf life)	Unfit equipment, use of damaged equipment, improper waste management	U/G Mining Infrastructure - Safety Equipment, Lamps etc. and Storage - Safety Equipment	Standard Operating Procedures; Best Management Practices, Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
374	Inadequate safety equipment training	Human injury, cost, reputation	U/G Mining Infrastructure - Safety Equipment, Lamps etc. and Storage - Safety Equipment	Standard Operating Procedures; Best Management Practices, Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
375	Explosions, fire	Explosions, fire, human injury, collisions, accidents, damage to property	OP Mining Equipment - Mobile Equipment - Transportation - Movement of Staff and Maintenance vehicles - Explosive Mixing truck	Explosives Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training, Engineering QA, Regulatory Permits	Safety and Health	Level 1	Rare	E	1	L 25
376	Explosion / fire	Fire, damage, human injury, air quality, mine shut-down	OP Mining Infrastructure - Explosive Magazine - Storage / Handling	Emergency Response Plan, Explosives Management Plan, Security System, Standard Operating Procedures; Best Management Practices, Regulatory Permits	Safety and Health	Level 1	Rare	E	1	L 25
377	Improper handling / storage / disposal	Equipment damage, human injury, spills	OP Mining Infrastructure - Explosive Magazine - Storage / Handling	Emergency Response Plan, Explosives Management Plan, Spill Management Plan, Security System, Standard Operating Procedures; Best Management Practices, Regulatory Permits	Safety and Health	Level 1	Rare	E	1	L 25
378	Inadequate condition of safety equipment	Failure of safety equipment, human injury	OP Mining Infrastructure - Safety Equipment, Lamps etc. and Storage - Maintenance of Safety Equipment	Health and Safety Plan, Maintenance Procedures, Standard Operating Procedures; Best Management Practices, PPE	Safety and Health	Level 1	Rare	E	1	L 25
379	Inadequate safety equipment training	Human injury, cost, reputation	OP Mining Infrastructure - Safety Equipment, Lamps etc. and Storage -Safety Equipment	Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Training, PPE	Safety and Health	Level 1	Rare	E	1	L 25
380	Fire, spills, explosions	Human injury, equipment damage, fire, mine shut-down, spills, explosions	Ancillary Facilities - Truck Shop and Maintenance Shop - Maintenance	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Emergency Response Plan, Engineering QA, Regulatory Permits	Safety and Health	Level 1	Rare	E	1	L 25
381	Explosion / fire	Fire, damage, human injury, air quality, mine shut-down	U/G Mining Infrastructure - Underground Explosive Magazine - Storage / Handling	Explosives Management Plan, Emergency Response Plan, Regulatory Permits, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures, PPE	Safety and Health	Level 1	Rare	E	1	L 25
382	Fire / explosion	Spills when filling fuel truck, human injury, fire, equipment damage	U/G Mining Infrastructure - U/G Fuel Distribution Fueling of set Heavy Equipment	Emergency Response Plan, Spill Management Plan, Standard Operating Procedures; Best Management Practices, Design Mine Plan,	Safety and Health	Level 1	Rare	E	1	L 25
383	Blasting, heavy equipment moving, spill from equipment failure (mobile), Accidents and equipment damage, rock fall	Flying debris, dust, noise, accidents, collisions, spills, human injury, generation of deleterious substances (silt, soil and Nitrates and NH3, NH4), fire, and waste management, Rock Fall (from truck or wall)	Mining - Infrastructure Development (Capital) - Mining the Resource	Standard Operating Procedures; Best Management Practices, Training, Design Engineering (Ground Movement Sensors)	Safety and Health	Level 1	Rare	E	1	L 25
384	Inadequate condition of safety equipment	Failure of safety equipment, human injury	OP Mining Infrastructure - Safety Equipment, Lamps etc. and Storage - Maintenance of Safety Equipment	Health and Safety Plan, Maintenance Procedures, Standard Operating Procedures; Best Management Practices, PPE	Reputation	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
385	Fire / explosion	Spills when filling fuel truck, human injury, fire, equipment damage	OP Mining Infrastructure - OP Fuel Storage and Distribution Fueling of Heavy Equipment	Spill Management Plan, Engineering, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Safety and Health	Level 1	Rare	E	1	L 25
386	Fire / explosion / spills / tank failure / hose failure / nozzle failure	Release to environment, human injury, Property damage, human injury, air pollution, Fire	Utilities - Fuel, Storage, & Distribution - Diesel - Fuel transfer, Storage, Fueling of Diesel	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Rare	E	1	L 25
387	Fire / explosion / spills / tank failure / hose failure / nozzle failure	Release to environment, human injury, property damage, human injury, air pollution, fire	Utilities - Fuel, Storage, & Distribution - Gasoline - Restocking, Storage, Fueling of Gasoline	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Rare	E	1	L 25
388	Spills / tank failure / hose failure / nozzle failure	Spill human injury, property damage	Utilities - Fuel, Storage, & Distribution - Oil and Grease - Restocking, Storage, Use of Oil and Greases	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
389	Spills / tank failure / hose failure / nozzle failure	Spill human injury, property damage	Utilities - Fuel, Storage, & Distribution - Waste Oil Disposal - Temporary Storage of waste	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
392	Loss of power	Fire, spills, loss of power, equipment damage, damage to property, human injury	Utilities - Water Systems - Fire Water - Use of Fire water	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Emergency Response Plan, Maintenance Procedures	Safety and Health	Level 1	Rare	E	1	L 25
395	Congestion, collisions	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Ancillary Facilities - Warehouse - Operation	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Spill Management Plan, Emergency Response Plan	Reputation	Level 1	Rare	E	1	L 25
396	Congestion, collisions	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Ancillary Facilities - Security / Scale House - Operation	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Spill Management Plan	Reputation	Level 1	Rare	E	1	L 25
397	Fire	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Temporary Facilities - Construction Laydown Area - Operation of Laydown Area	Standard Operating Procedures; Best Management Practices, Emergency Response Plan, Traffic Management Plan, Spill Management Plan, Engineering (Design/Control/OA/QC)	Safety and Health	Level 1	Rare	E	1	L 25
400	Structural failure / damage / fire	Damage to property, human injury, mine shut-down, damage to reputation, fire	Ancillary Facilities - Mill and Mine Dry, First Aid - Structure	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Emergency Response Plan, Design	Safety and Health	Level 1	Rare	E	1	L 25
401	Structural failure / damage / fire	Damage to property, human injury, mine shut-down, damage to reputation, fire	Ancillary Facilities - Mill and Mine Dry, First Aid - Structure	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Emergency Response Plan, Design	Reputation	Level 1	Rare	E	1	L 25
402	Structural failure / damage / fire	Damage to property, human injury, mine shut-down, damage to reputation, fire	Ancillary Facilities - Warehouse - Structure	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Emergency Response Plan, Maintenance Procedures	Safety and Health	Level 1	Rare	E	1	L 25
406	Loss of lighting, attraction of animals	Loss of yard lighting, light pollution, reduction of visibility, congestion, accidents, attraction of animals, human injury	General Development - Yard Lighting - Yard Lighting	Engineering, Health and Safety Plan, Wildlife Management Plan, Standard Operating Procedures; Best Management Practices	Safety and Health	Level 1	Rare	E	1	L 25
407	Emissions from equipment / poor maintenance	Damage of equipment, human injury, spills from equipment	U/G Mining Equipment - Mobile Equipment - Equipment Maintenance	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Spill Management Plan, Regulatory Permits, PPE, Air Monitors	Safety and Health	Level 1	Rare	E	1	L 25
408	Fire / spills	Poor air quality / ventilation, Spills	U/G Mining Equipment - Fixed Equipment -Gates and Chutes	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering, Engineering QA, PPE, Spill Management Plan, Air Monitors	Safety and Health	Level 1	Rare	E	1	L 25
409	Fire	Poor air quality / ventilation, human injury	U/G Mining Equipment - Fixed Equipment -Doors	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering, Engineering QA, PPE, Spill Management Plan, Air Monitors	Safety and Health	Level 1	Rare	E	1	L 25
410	Spill from fueling heavy equipment (fueling of drills, loaders, trucks)	Spills when filling fuel truck, spills from filling equipment, spills from fuel truck (maintenance)	U/G Mining Infrastructure - U/G Fuel Distribution Fueling of set Heavy Equipment	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Design	Safety and Health	Level 1	Rare	E	1	L 25
411	Release of soil and sediments	Release of deleterious substances, collapse of pile (make sure that the grade of the pile is ok)	Mining - Infrastructure Development (Capital) - Storage of Topsoil	Mine Plan, Hydro Seeding, Standard Operating Procedures; Best Management Practices, Training, Design Engineering (Water Collection Systems)	Environment	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
412	Release of soil and sediments	Release of deleterious substances, collapse of pile (make sure that the grade of the pile is ok), potential acid generation	Mining - Infrastructure Development (Capital) - Storage of Overburden (Overburden)	Mine Plan, Standard Operating Procedures; Best Management Practices, Training, Design Engineering (Water Collection Systems)	Environment	Level 1	Rare	E	1	L 25
413	Emissions from equipment / poor maintenance	Damage of equipment, human injury, spills from equipment	OP Mining Equipment - Mobile Equipment - Equipment Maintenance	Spill Management Plan, Engineering (Air Quality Monitors), Maintenance Procedures, Standard Operating Procedures; Best Management Practices, Training, Engineering QA, Regulatory Permits	Safety and Health	Level 1	Rare	E	1	L 25
414	Emissions from equipment / poor maintenance	Damage of equipment, human injury, spills from equipment	OP Mining Equipment - Mobile Equipment - Equipment Maintenance	Spill Management Plan, Engineering (Air Quality Monitors), Maintenance Procedures, Standard Operating Procedures; Best Management Practices, Training, Engineering QA, Regulatory Permits	Environment	Level 1	Rare	E	1	L 25
415	Spills to water	Contaminants within contact water from spills	OP Mining Infrastructure - Pump Station (Dewatering) - Pumping / Dewatering	Spill Management Plan, Engineering, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training, Engineering QA, Regulatory Permits	Environment	Level 1	Unlikely	D	1	L 24
416	Spill from fueling heavy equipment (fueling of drills, loaders, trucks)	Spills when filling fuel truck, spills from filling equipment, spills from fuel truck (maintenance)	OP Mining Infrastructure - OP Fuel Storage and Distribution Fueling of Heavy Equipment	Spill Management Plan, Engineering, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training, Engineering QA, Regulatory Permits	Safety and Health	Level 1	Rare	E	1	L 25
417	Noise	Proximate effects on worker health, noise "pollution" of surrounding area	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from ROM to Primary Crusher	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Environment	Level 1	Rare	E	1	L 25
418	Noise	Proximate effects on worker health, noise "pollution" of surrounding area	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from Primary Crusher to Mill	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Environment	Level 1	Rare	E	1	L 25
419	Noise	Proximate effects on worker health, noise "pollution" of surrounding area	Primary Grinding - SAG Mill Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Environment	Level 1	Rare	E	1	L 25
420	Noise	Noise release, human injury	Utilities - Power & Electrical - Emergency Power - Emergency Power operations	Design (Inbuilding), Standard Operating Procedures; Best Management Practices, Noise Management Plan, Maintenance Procedures, PPE, Noise Management Plan	Environment	Level 1	Rare	E	1	L 25
421	Air emissions (NOx)	Increase in emissions, reduced air quality if attracted into vents, human injury	Utilities - Power & Electrical - Emergency Power - Emergency Power operations	Design (Inbuilding), Standard Operating Procedures; Best Management Practices, Noise Management Plan, Maintenance Procedures, PPE	Environment	Level 1	Rare	E	1	L 25
422	Inadequate design	Loss of light, safety, property damage, human injury	Utilities - Power & Electrical - Area Lighting - Emergency Lighting	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
423	Inadequate maintenance	Loss of light, safety, property damage, human injury	Utilities - Power & Electrical - Area Lighting - Emergency Lighting	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
424	Spill	Release to environment, human injury, property damage, human injury, air pollution	Utilities - Fuel, Storage, & Distribution - Diesel - Fuel transfer, Storage, Fueling of Diesel	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Rare	E	1	L 25
425	Spill	Release to environment, human injury, property damage, human injury, air pollution	Restocking, Storage, Fueling of Gasoline	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
426	Fire	Release to environment, human injury, property damage, human injury, air pollution	Restocking, Storage, Use of Oil and Greases	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
427	Fire	Release to environment, human injury, property damage, human injury, air pollution	Utilities - Fuel, Storage, & Distribution - Waste Oil Disposal - Temporary Storage of waste	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
428	Contamination / change in source water conditions	Human injury, cost, regulatory non-compliance, changes in source water conditions	Utilities - Water Systems - General Water	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Use Other Drinking Water	Safety and Health	Level 1	Rare	E	1	L 25
430	Nuisance animals / attraction of animals	Human - animal interactions, human injury, collisions with animals	Utilities - Waste Disposal - Solid Waste Disposal (General) - Storage of Waste (Domestic Refuse and Recycling)	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Wildlife Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
431	Nuisance animals / attraction of animals	Human - animal interactions, human injury, collisions with animals	Utilities - Waste Disposal - Solid Waste Disposal (General) - Storage of Waste (Domestic Refuse and Recycling)	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Wildlife Management Plan	Environment	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
432	Over generation of waste / lack of pick-up	Human - animal interactions, human injury, collisions with animals, regulatory non-compliance	Utilities - Waste Disposal - Solid Waste Disposal (General) - Storage of Waste (Domestic Refuse)	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Wildlife Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
433	Over generation of waste / lack of pick-up	Human - animal interactions, human injury, collisions with animals, regulatory non-compliance	Utilities - Waste Disposal - Solid Waste Disposal (General) - Storage of Waste (Domestic Refuse)	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Wildlife Management Plan	Environment	Level 1	Rare	E	1	L 25
434	Inadequate diversion of waste	Regulatory non-compliance, cost, human injury, attraction of animals	Waste Diversion	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Wildlife Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
435	Inadequate diversion of waste	Regulatory non-compliance, cost, human injury, attraction of animals	Waste Diversion	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Wildlife Management Plan	Environment	Level 1	Rare	E	1	L 25
436	Fire	Human injury, fire, property damage, regulatory non-compliance	Storage of Waste	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Design, Waste Management Plan, Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
437	Improper storage of hazardous waste	Human injury, fire, property damage, explosion, regulatory non-compliance	Hazardous waste	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
438	Improper storage of hazardous waste	Human injury, fire, property damage, explosion, regulatory non-compliance	Hazardous waste	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan	Environment	Level 1	Rare	E	1	L 25
439	Spill	Release to environment, human injury, property damage, human injury, air pollution	Hazardous waste	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Spill Management Plan, Design	Safety and Health	Level 1	Rare	E	1	L 25
440	Spills, splashes	Release to environment, human injury, property damage, human injury, air pollution	Utilities - Waste Disposal - Sewage Storage - Operations / Storage / Handling	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Spill Management Plan, Design, Regulatory Permits	Safety and Health	Level 1	Rare	E	1	L 25
441	Mechanical failure / electrical failure	Spills, loss of "power" to pneumatic equipment (loss of production), human injury (equipment or line failure), equipment damage, spills, uncontrolled process	Utilities - Other - Plant and Instrument air - Compressed Air	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Emergency Response Plan, Design	Safety and Health	Level 1	Rare	E	1	L 25
442	Breakage of pipe / delivery system	Loss of "power" to pneumatic equipment (loss of production); human injury (equipment or line failure), equipment damage, equipment damage, spills, uncontrolled process	Compressed Air	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Emergency Response Plan, Design	Safety and Health	Level 1	Rare	E	1	L 25
443	Contact with biological hazards / sharps	Human injury, spills, improper disposal of biohazard materials	Ancillary Facilities - Mill and Mine Dry, First Aid - First Aid	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Emergency Response Plan, Waste Management Plan (Hazardous Waste Management Plan)	Environment	Level 1	Rare	E	1	L 25
444	Contact with biological hazards / sharps	Human injury, spills, improper disposal of biohazard materials	Ancillary Facilities - Mill and Mine Dry, First Aid - First Aid	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Emergency Response Plan, Waste Management Plan (Hazardous Waste Management Plan)	Reputation	Level 1	Rare	E	1	L 25
445	Improper storage	Cross contamination, human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage), nuisance animals	Ancillary Facilities - Warehouse -Storage	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control)	Environment	Level 1	Rare	E	1	L 25
448	Inadequate training	Incorrect analysis, incorrect use of chemicals, incorrect calibration, explosion, fire, cost, production loss	Ancillary Facilities - Assay/Met/Environmental Lab Chemical Use	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Waste Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
449	Fire, spills, explosions	Human injury, equipment damage, fire, mine shut-down, spills, explosions	Ancillary Facilities - Truck Shop and Maintenance Shop - Maintenance	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Emergency Response Plan, Engineering QA, Regulatory Permits	Environment	Level 1	Rare	E	1	L 25
450	Spills, emissions from equipment	Release to environment, spills	Operation of Laydown Area	Standard Operating Procedures; Best Management Practices, Emergency Response Plan, Traffic Management Plan, Spill Management Plan, Engineering (Design/Control/QA/QC), Engineering (Air Quality Monitors)	Safety and Health	Level 1	Rare	E	1	L 25
451	Loss of power / power failure	Spills, releases from uncontrolled process (air and liquid), property damage, human injury	General Development - Fencing/Gates (Site Control) -Back-up Power (UPS)	Engineering (OC-TV, Fence and Gates), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Safety and Health	Level 1	Rare	E	1	L 25
452	Blockage / inadequate design	Unplanned blockage, snow build-up, ice build-up, animal ingress	Mining Underground - Ventilation Shafts -Design of Shaft	Engineering QA, Engineering QA, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training, Maintenance Procedures, Wildlife Management Plan	Environment	Level 1	Rare	E	1	L 25
453	Blockage / inadequate design	Unplanned blockage, snow build-up, ice build-up, animal ingress	U/G Mining Infrastructure - Portal Infrastructure Design of Portal	Design, Standard Operating Procedures; Best Management Practices, Engineering QA, Emergency Response Plan, Maintenance Procedures, Wildlife Management Plan	Environment	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
454	Spillage of tailings	Human injury, ground contamination, groundwater contamination	Paste Plant and Distribution - Plant Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Separation, Spill Management Plan, Engineering (Design), Engineering QA, Shut-down Procedures	Environment	Level 1	Rare	E	1	L 25
455	Improper ventilation	Fire, explosion, human injury, indoor air quality, regulatory non-compliance	Ancillary Facilities - Assay/Met/Environmental Lab-Chemical / Laboratory Equipment Use	Standard Operating Procedures; Best Management Practices, Training, Engineering (Design)	Environment	Level 1	Rare	E	1	L 25
456	Release of deleterious substances	Release to environmental (chemical, oils, dirt)	Ancillary Facilities - Truck Shop and Maintenance Shop - Truck Wash	Standard Operating Procedures; Best Management Practices, Emergency Response Plan, Design, Engineering QA	Environment	Level 1	Rare	E	1	L 25
457	Overflow of spillway	Human injury, damage to property, spill, release to environment, contamination to groundwater and surface water, loss of production, cost, regulatory non-compliance, damage to property (Treasury), damaged to surrounding environment, deputation	Operations / Storage of Tailings	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control/QA/QC), Third Party Review, Emergency Response Plan, Predictive Modelling, TSF Surveillance/Monitoring, Groundwater Monitoring	Safety and Health	Level 1	Rare	E	1	L 25
458	Collision with conductors or towers	Structural damage, potential power interruption, human injury	Offsite Infrastructure - Offsite Power Transmission Construction/Operational Activity in proximity to line	Standard Operating Procedures; Best Management Practices, Training, Emergency Response Plan	Safety and Health	Level 1	Rare	E	1	L 25
459	Emissions from equipment / poor maintenance	Damage of equipment, human injury, spills from equipment	U/G Mining Equipment - Mobile Equipment - Equipment Maintenance	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Spill Management Plan, Regulatory Permits, PPE, Air Monitors	Environment	Level 1	Rare	E	1	L 25
460	Fire / spills	Poor air quality / ventilation, Spills	U/G Mining Equipment - Fixed Equipment -Gates and Chutes	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering, Engineering QA, PPE, Spill Management Plan, Air Monitors	Environment	Level 1	Rare	E	1	L 25
461	Fire	Poor air quality / ventilation, human injury	U/G Mining Equipment - Fixed Equipment -Doors	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering, Engineering QA, PPE, Spill Management Plan, Air Monitors	Environment	Level 1	Rare	E	1	L 25
483	Spills, emissions from equipment	Release to environment, spills	Operation of Laydown Area	Standard Operating Procedures; Best Management Practices, Emergency Response Plan, Traffic Management Plan, Spill Management Plan, Engineering (Design/Control/QA/QC), Engineering (Air Quality Monitors)	Environment	Level 1	Rare	E	1	L 25
484	Explosions, fire	Explosions, fire, human injury, collisions, accidents, damage to property	U/G Mining Equipment - Mobile Equipment - Explosive Mixing truck	Safe Work Procedures, Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Spill Management Plan, Regulatory Permits	Environment	Level 1	Rare	E	1	L 25
485	Fire, spills, explosions	Human injury, equipment damage, Fire, mine shut-down, spills, explosions	U/G Mining Infrastructure - Underground Workshop (and/or Service Bay) - Maintenance	Explosives Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures, PPE	Environment	Level 1	Rare	E	1	L 25
486	Explosion / fire	Fire, damage, human injury, air quality, mine shut-down	U/G Mining Infrastructure - Underground Explosive Magazine - Storage / Handling	Explosives Management Plan, Emergency Response Plan, Regulatory Permits, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Maintenance Procedures, PPE	Environment	Level 1	Rare	E	1	L 25
487	Improper handling / storage / disposal	Equipment damage, human injury, spills	U/G Mining Infrastructure - Underground Explosive Magazine - Storage / Handling	Emergency Response Plan, Explosives Management Plan, Standard Operating Procedures; Best Management Practices, Engineering QA, Environmental Permits	Environment	Level 1	Rare	E	1	L 25
488	Uncontrolled blast	Human injury, equipment damage, spills, fire, loss of production	U/G Mining Infrastructure - Controls, Instrumentation and Communication -Blasting Control	Explosives Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Engineering, Training, Engineering QA, PPE	Environment	Level 1	Rare	E	1	L 25
489	Explosions, fire	Explosions, fire, human injury, collisions, accidents, damage to property	OP Mining Equipment - Mobile Equipment - Transportation - Movement of Staff and Maintenance vehicles - Explosive Mixing truck	Explosives Management Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training, Engineering QA, Regulatory Permits	Environment	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
490	Explosion / fire	Fire, damage, human injury, air quality, mine shut-down	OP Mining Infrastructure - Explosive Magazine - Storage / Handling	Emergency / Response Plan, Explosives Management Plan, Security System, Standard Operating Procedures; Best Management Practices, Regulatory Permits	Environment	Level 1	Rare	E	1	L 25
491	Improper handling / storage / disposal	Equipment damage, human injury, spills	OP Mining Infrastructure - Explosive Magazine - Storage / Handling	Emergency Response Plan, Explosives Management Plan, Spill Management Plan, Security System, Standard Operating Procedures; Best Management Practices, Regulatory Permits	Environment	Level 1	Rare	E	1	L 25
492	Structural failure / damage / fire	Damage to property, human injury, mine shut-down, damage to reputation, fire	Ancillary Facilities - Warehouse - Structure	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Emergency Response Plan, Maintenance Procedures	Environment	Level 1	Rare	E	1	L 25
493	Fire	Human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage)	Temporary Facilities - Construction Laydown Area - Operation of Laydown Area	Standard Operating Procedures; Best Management Practices, Emergency Response Plan, Traffic Management Plan, Spill Management Plan, Engineering (Design/Control/QA/QC)	Environment	Level 1	Rare	E	1	L 25
494	Collisions (human, vehicle, infrastructure)	Human injury, equipment damage, loss of production, fire, spills	Mill Feed and Storage - SAG Mill Feed Stock Pile - Operation of Mobile Equipment at Dead Stock Pile	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Health and Safety Plan, PPE	Environment	Level 1	Rare	E	1	L 25
497	Inadequate heating / loss of fuel	Human injury, ice build-up and loss of production, damage of equipment (pipes, etc.)	U/G Mining Infrastructure - Mine Heating - Heating	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Emergency Response Plan, Health and Safety Plan, Engineering, Engineering QA, Training	Safety and Health	Level 1	Rare	E	1	L 25
498	Precipitation contact water	Ground contamination (e.g., PAG), surface/ground water contamination	Mill Feed and Storage - SAG Mill Feed Stock Pile - Transportation/Storage of Ore from ROM to Primary Crusher	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, Surface Water Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
499	Contact water	Ground contamination (e.g., PAG), surface/ground water contamination	Mill Feed and Storage - SAG Mill Feed Stock Pile - Transportation/Storage of Ore from Primary Crusher to Mill	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Surface Water Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
500	Nuisance animals (rats, mice)	Loss of production, loss of safety infrastructure, property damage, human injury	Utilities - Power & Electrical - Power Distribution - Power Operation	Design, Wildlife Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training, PPE	Safety and Health	Level 1	Rare	E	1	L 25
501	Nuisance animals (rats, mice)	Loss of production, loss of safety infrastructure, property damage, human injury	Utilities - Power & Electrical - Emergency Power - Emergency Power Operation	Design, Health and Safety Plan, Wildlife Management Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Safety and Health	Level 1	Rare	E	1	L 25
505	Mechanical failure / electrical failure	Spills, loss of "power" to pneumatic equipment (loss of production); human injury (equipment or line failure), equipment damage, spills, uncontrolled process	Utilities - Other - Plant and Instrument air - Compressed Air	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Emergency Response Plan, Design	Reputation	Level 1	Rare	E	1	L 25
506	Breakage of pipe / delivery system	Loss of "power" to pneumatic equipment (loss of production); human injury (equipment or line failure), equipment damage, equipment damage, spills, uncontrolled process	Compressed Air	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Emergency Response Plan, Design	Reputation	Level 1	Rare	E	1	L 25
507	Structural failure / damage / fire	Damage to property, human injury, mine shut-down, damage to reputation, fire	Ancillary Facilities - Mill and Mine Dry, First Aid - Structure	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Emergency Response Plan, Design	Environment	Level 1	Rare	E	1	L 25
510	Loss of power / power failure	Spills, releases from uncontrolled process (air and liquid), property damage, human injury	General Development - Fencing/Gates (Site Control) - Back-up Power (UPS)	Engineering (CC-TV, Fence and Gates), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Environment	Level 1	Rare	E	1	L 25
511	Alarm failure	Human injury, damage to property, air quality, threat to surrounding areas and properties	General Development - Site Evacuation Alarm Systems - Evacuation Systems operation	Emergency Response Plan (Provincial Fire Protection), Emergency Shutdown Procedures, Engineering (Radio System and Phones), Health and Safety Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Environment	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
512	Slow reaction to evacuation	Human injury, damage to property, air quality, threat to surrounding areas and properties	General Development - Site Evacuation Alarm Systems - Fire Systems operation	Emergency Response Plan (Provincial Fire Protection), Emergency Shutdown Procedures, Engineering (Radio system and Phones), Health and Safety Plan, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Training	Environment	Level 1	Rare	E	1	L 25
513	Blockage / inadequate design	Unplanned blockage, snow build-up, ice build-up, animal ingress	Mining Underground - Ventilation Shafts - Design of Shaft	Engineering, Engineering QA, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training, Maintenance Procedures, Wildlife Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
514	Poor location	Noise, air quality (outtake), public complaints from visibility, air quality (intake)	Mining Underground - Ventilation Shafts - Design of Shaft	Engineering, Engineering QA, Emergency Response Plan, Standard Operating Procedures; Best Management Practices, Training, Maintenance Procedures, Wildlife Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
519	Blockage / inadequate design	Unplanned blockage, snow build-up, ice build-up, animal ingress	U/G Mining Infrastructure - Portal Infrastructure Design of Portal	Design, Standard Operating Procedures; Best Management Practices, Engineering QA, Emergency Response Plan, Maintenance Procedures, Wildlife Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
520	Inadequate condition of safety equipment	Failure of safety equipment, human injury	U/G Mining Infrastructure - Safety Equipment, Lamps etc. and Storage - Maintenance of Safety Equipment	Standard Operating Procedures; Best Management Practices, Health and Safety Plan, PPE	Reputation	Level 1	Rare	E	1	L 25
521	Expiry of equipment (wear or shelf life)	Unfit equipment, use of damaged equipment, improper waste management	U/G Mining Infrastructure - Safety Equipment, Lamps etc. and Storage - Safety Equipment	Standard Operating Procedures; Best Management Practices, Health and Safety Plan	Reputation	Level 1	Rare	E	1	L 25
522	Inadequate safety equipment training	Human injury, cost, reputation	U/G Mining Infrastructure - Safety Equipment, Lamps etc. and Storage - Safety Equipment	Standard Operating Procedures; Best Management Practices, Health and Safety Plan	Reputation	Level 1	Rare	E	1	L 25
523	Release of soil and sediments	Release of deleterious substances, collapse of pile (make sure that the grade of the pile is ok)	Mining - Infrastructure Development (Capital) - Storage of Topsoil	Mine Plan, Hydro Seeding, Standard Operating Procedures; Best Management Practices, Training, Design Engineering (Water Collection Systems)	Reputation	Level 1	Rare	E	1	L 25
524	Inadequate safety equipment training	Human injury, cost, reputation	OP Mining Infrastructure - Safety Equipment, Lamps etc. and Storage - Safety Equipment	Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Training, PPE	Reputation	Level 1	Rare	E	1	L 25
525	Noise	Proximate effects on worker health, noise "pollution" of surrounding area	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from ROM to Primary Crusher	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
526	Noise	Proximate effects on worker health, noise "pollution" of surrounding area	Mill Feed and Storage - SAG Mill Feed Stock Pile Transportation/Storage of Ore from Primary Crusher to Mill	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
527	Noise	Proximate effects on worker health, noise "pollution" of surrounding area	Primary Grinding - SAG Mill Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Health and Safety Plan, PPE, Noise Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
528	Tank failure (780 m ³)	Ground contamination, ground / surface water contamination, human injury, equipment damage, loss of production	CIL - CIL Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Shut-down Procedures, Engineering (Design), Engineering QA, PPE, Spill Management Plan	Reputation	Level 1	Rare	E	1	L 25
530	Tank spillage / overflow	Ground contamination, ground / surface water contamination, human injury, equipment damage, loss of production	CIL Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Spill Management Plan	Reputation	Level 1	Rare	E	1	L 25
533	Spill / splash of electrolyte	Human injury, environmental release	General electrowinning operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE, Spill Management Plan	Reputation	Level 1	Rare	E	1	L 25
534	Tank failure (250 m ³)	Ground contamination, ground / surface water contamination, human injury, equipment damage, loss of production	Cyanide Destruction - System Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, Shut-down Procedures	Reputation	Level 1	Rare	E	1	L 25
536	Equipment / instrumentation failure	Process failure (insufficient CN destruction leading to higher CN in TSF), fire (e.g., agitator motors)	Cyanide Destruction - System Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, Shut-down Procedures	Reputation	Level 1	Rare	E	1	L 25
538	Spill / splash / off gas	Human injury, environmental release (e.g., of SO ₂)	Cyanide Destruction - System Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA, Shut-down Procedures	Reputation	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
540	Noise	Noise release, human injury	Utilities - Power & Electrical - Emergency Power - Emergency Power operations	Design (Inbuilding), Standard Operating Procedures; Best Management Practices, Maintenance Procedures, PPE	Safety and Health	Level 1	Rare	E	1	L 25
541	Air emissions (NOx)	Increase in emissions, reduced air quality if attracted into vents, human injury	Utilities - Power & Electrical - Emergency Power - Emergency Power operations	Design (Inbuilding), Standard Operating Procedures; Best Management Practices, Noise Management Plan, Maintenance Procedures, PPE	Safety and Health	Level 1	Rare	E	1	L 25
542	Fire / explosion	Property damage, human injury, air pollution, release of fuel to air, or environment (-45 or less)	Utilities - Fuel, Storage, & Distribution - Propane - Propane Use	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Environment	Level 1	Rare	E	1	L 25
543	Fire / explosion	Property damage, human injury, air pollution, release of fuel to air	Utilities - Fuel, Storage, & Distribution - Natural Gas - Natural Gas Use	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Environment	Level 1	Rare	E	1	L 25
544	Contact with property resulting in damage (mobile equipment, human)	Loss of production, human injury, damage to property, release to the air, fire, explosion	Utilities - Fuel, Storage, & Distribution - Propane - Propane Fork Lifts	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Environment	Level 1	Rare	E	1	L 25
545	Loss of supply (heat)	Loss of production, human injury, damage to property	Utilities - Fuel, Storage, & Distribution - Natural Gas - Natural Gas	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Safety and Health	Level 1	Rare	E	1	L 25
546	Contact with lines resulting in damage (mobile equipment, human)	Loss of production, human injury, damage to property, release to the air, fire, explosion	Utilities - Fuel, Storage, & Distribution - Natural Gas - Natural Gas	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Environment	Level 1	Rare	E	1	L 25
547	Fire / explosion / spills / tank failure / hose failure / nozzle failure	Release to environment, human injury, property damage, human injury, air pollution, fire	Utilities - Fuel, Storage, & Distribution - Diesel - Fuel transfer, Storage, Fueling of Diesel	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
548	Inadequate disposal	Regulatory non-compliance	Disposal of Waste	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Engineering (Design/Control), Health and Safety Plan, Regulatory Permits	Environment	Level 1	Rare	E	1	L 25
549	Contamination / change in line water conditions (mixing of process fluids and potable)	Human injury, cost, regulatory non-compliance, contamination of source water, combination of potable with process	Utilities - Water Systems - General Water	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Use Other Drinking Water, Operation and Testing Procedures	Safety and Health	Level 1	Rare	E	1	L 25
550	Failure of treatment plant	Human injury, loss of production, cost, regulatory non-compliance	Treatment of Water	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures, Use Other Drinking Water, Operation and Testing Procedures	Safety and Health	Level 1	Rare	E	1	L 25
551	Contamination / change in line water conditions (mixing of process fluids and gland water)	Combination of gland water with process, pump damage, loss of production	Utilities - Water Systems - Gland Water	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
552	Improper disposal of hazardous waste	Regulatory non-compliance, release to environment, human injury, fire	Hazardous waste	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Spill Management Plan, Design, Regulatory Permits	Environment	Level 1	Rare	E	1	L 25
553	Inadequate location of storage	Regulatory non-compliance, release to environment, human injury, fire	Operations / Storage / Handling	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Spill Management Plan, Design, Regulatory Permits	Environment	Level 1	Rare	E	1	L 25
554	Contact with biological hazards / sharps	Human injury, spills, improper disposal of biohazard materials	Ancillary Facilities - Mill and Mine Dry, First Aid - First Aid	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Emergency Response Plan, Waste Management Plan (Hazardous Waste Management Plan)	Safety and Health	Level 1	Rare	E	1	L 25
555	Improper storage	Cross contamination, human injury, fire, explosions, spills, loss of production, cost (loss of inventory and material damage), nuisance animals	Ancillary Facilities - Warehouse - Storage	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan	Safety and Health	Level 1	Rare	E	1	L 25
556	Improper chemical handling / disposal	Fire, explosion, human injury, indoor air quality, regulatory non-compliance, incorrect calibration	Ancillary Facilities - Assay/Met/Environmental Lab - Chemical Use	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Waste Management Plan	Environment	Level 1	Rare	E	1	L 25
557	Improper chemical handling / disposal	Fire, explosion, human injury, indoor air quality, regulatory non-compliance, incorrect calibration	Ancillary Facilities - Assay/Met/Environmental Lab - Chemical Use	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Waste Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
558	Inadequate training	Incorrect analysis, incorrect use of chemicals, incorrect calibration, explosion, fire, cost, production loss	Ancillary Facilities - Assay/Met/Environmental Lab - Chemical Use	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Waste Management Plan	Environment	Level 1	Rare	E	1	L 25
559	Contact with wildlife, access for public, access to equipment, threat to security	Human injury, attraction of wildlife, theft, access to equipment /explosives	General Development - Fencing/Gates (Site Control) - Installing and Operation of fencing and gate	Engineering (Fence and Gates), Health and Safety Plan, Standard Operating Procedures; Best Management Practices, Training, Wildlife Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
560	Unauthorized access	Theft, damage to property equipment	U/G Mining Infrastructure - Underground Explosive Magazine - Supply / Storage	Security System, Operating Procedures	Safety and Health	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
561	Unauthorized access	Theft, damage to property equipment	OP Mining Infrastructure - Explosive Magazine - Supply / Storage	Explosives Management Plan, Security System, Standard Operating Procedures; Best Management Practices	Safety and Health	Level 1	Rare	E	1	L 25
562	Spill	Release to environment, human injury, property damage, human injury, air pollution	Utilities - Fuel, Storage, & Distribution - Diesel - Fuel transfer, Storage, Fueling of Diesel	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
563	Spill	Release to environment, human injury, property damage, human injury, air pollution	Restocking, Storage, Fueling of Gasoline	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Reputation	Level 1	Rare	E	1	L 25
564	Fire	Release to environment, human injury, property damage, human injury, air pollution	Restocking, Storage, Use of Oil and Greases	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Reputation	Level 1	Rare	E	1	L 25
565	Fire	Release to environment, human injury, property damage, human injury, air pollution	Utilities - Fuel, Storage, & Distribution - Waste Oil Disposal - Temporary Storage of waste	Standard Operating Procedures; Best Management Practices, Spill Management Plan, Engineering (Design/Control), Health and Safety Plan	Reputation	Level 1	Rare	E	1	L 25
566	Fire	Human injury, fire, property damage, regulatory non-compliance	Storage of Waste	Spill Management Plan, Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan	Reputation	Level 1	Rare	E	1	L 25
567	Spill	Release to environment, human injury, property damage, human injury, air pollution	Hazardous waste	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Spill Management Plan, Design	Reputation	Level 1	Rare	E	1	L 25
568	Spills, splashes	Release to environment, human injury, property damage, human injury, air pollution	Utilities - Waste Disposal - Sewage Storage - Operations / Storage / Handling	Standard Operating Procedures; Best Management Practices, Waste Management Plan, Health and Safety Plan, Spill Management Plan, Design, Regulatory Permits	Reputation	Level 1	Rare	E	1	L 25
569	Failure / damage of equipment / insufficient warning of hazards	Human Injury, equipment damage, poor air quality, ground collapse	U/G Mining Equipment - Ancillary equipment (survey etc.) - Monitoring equipment (Ground control, Air Quality and Seismic)	Standard Operating Procedures; Best Management Practices, Emergency Response, Training, Engineering (Ground Monitors), Engineering QA, PPE	Environment	Level 1	Rare	E	1	L 25
570	Inadequate ventilation	Unable to monitor air flow, human injury	U/G Mining Infrastructure - Controls, Instrumentation and Communication - Ventilation Control	Maintenance Procedures, Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Training, Engineering QA, PPE	Safety and Health	Level 1	Rare	E	1	L 25
571	Inadequate design	Air quality, noise, human injury	U/G Mining Infrastructure - Primary Ventilation Fans (Main Fans) - Design of System	Standard Operating Procedures; Best Management Practices, Engineering, Engineering QA, Training, PPE	Safety and Health	Level 1	Rare	E	1	L 25
572	Loss of control / power failure of equipment	Unable to monitor air flow, human injury, mine shut-down	U/G Mining Infrastructure - Primary Ventilation Fans (Main Fans) - Ventilation Control	Standard Operating Procedures; Best Management Practices, Engineering, Engineering QA, Training, PPE	Safety and Health	Level 1	Rare	E	1	L 25
573	Inadequate design	Air quality, noise, human injury, inadequate training	U/G Mining Infrastructure - Secondary Ventilation Fans (Development Fans) - Design of System	Standard Operating Procedures; Best Management Practices, Engineering, Engineering QA, Training, PPE	Safety and Health	Level 1	Rare	E	1	L 25
574	Loss of control / power failure of equipment / equipment failure	Unable to monitor air flow, human injury, mine shut-down, inadequate training	U/G Mining Infrastructure - Secondary Ventilation Fans (Development Fans) - Ventilation Control	Standard Operating Procedures; Best Management Practices, Engineering, Engineering QA, Training	Safety and Health	Level 1	Rare	E	1	L 25
575	Release of soil and sediments	Release of deleterious substances, collapse of pile (make sure that the grade of the pile is ok), potential acid generation	Mining - Infrastructure Development (Capital) - Storage of Overburden (Overburden)	Mine Plan, Standard Operating Procedures; Best Management Practices, Training, Design Engineering (Water Collection Systems)	Reputation	Level 1	Rare	E	1	L 25
576	Failure / damage of equipment / insufficient warning of hazards	Human injury, equipment damage, poor air quality, ground collapse	OP Mining Equipment - Ancillary equipment (survey etc.) - Failure of seismic Sensor	Emergency Response Plan, Engineering (Ground Control Equipment)	Environment	Level 1	Rare	E	1	L 25
577	Spillage of tailings	Human injury, ground contamination, groundwater contamination	Paste Plant and Distribution - Plant Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Separation, Spill Management Plan, Engineering (Design), Engineering QA, Shut-down Procedures	Safety and Health	Level 1	Rare	E	1	L 25
578	Collision with bins / silos	Human injury, ground contamination, groundwater contamination, equipment damage	Paste Plant and Distribution - Plant Operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Spill Management Plan, Engineering (Design), Engineering QA, Shut-down Procedures, Traffic Management Plan	Safety and Health	Level 1	Rare	E	1	L 25
579	Improper ventilation	Fire, explosion, human injury, indoor air quality, regulatory non-compliance	Ancillary Facilities - Assay/Met/Environmental Lab, Chemical / Laboratory Equipment Use	Standard Operating Procedures; Best Management Practices, Training, Engineering (Design)	Safety and Health	Level 1	Rare	E	1	L 25

Item No.	RISK	Description/Consequence	Area of Impact	Controls	Impact Category	Severity Name	Likelihood Name	Likelihood	Severity	Risk Matrix Priority Number
580	Disruption of electrical protection system	Electrocution (human injury)	Electrowinning/Gold Room - General electrowinning operation	Standard Operating Procedures; Best Management Practices, Maintenance Procedures, Engineering (Design), Engineering QA, PPE	Reputation	Level 1	Rare	E	1	L 25
584	Structural failure / damage / fire	Damage to property, human injury, mine shut-down, damage to reputation, fire	Ancillary Facilities - Warehouse - Structure	Standard Operating Procedures; Best Management Practices, Engineering (Design/Control), Health and Safety Plan, Emergency Response Plan, Maintenance Procedures	Reputation	Level 1	Rare	E	1	L 25
588	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, Heavy debris (resource rocks), communication with haul trucks	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	OP Mining Equipment - Mobile Equipment - Transportation - Heavy equipment (resources to Mine pad)	Standard Operating Procedures; Best Management Practices, Training, Emergency Response Plan, Traffic Management Plan, Spill Management Plan	Reputation	Level 1	Rare	E	1	L 25
589	Heavy equipment moving, spill from equipment failure (mobile), accidents and equipment damage, heavy debris (resource rocks), poor communication with heavy equipment	Flying debris, air emissions, dust, noise, accidents, collisions, fire equipment, spills, human injury, and waste management	OP Mining Equipment - Mobile Equipment - Transportation - Movement of Staff and Maintenance vehicles	Standard Operating Procedures; Best Management Practices, Training, Emergency Response Plan, Traffic Management Plan, Spill Management Plan	Reputation	Level 1	Rare	E	1	L 25