Appendix D
Waste Management Plan

WASTE MANAGEMENT PLAN

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1 Introduction

Waste management at McArthur River Mining Pty Ltd is an integral component of McArthur River Mines environmental management system. Waste management at McArthur River aims to reduce waste production through recovery, re-use and recycling; through encouraging efficient utilisation of resources. McArthur River Mining also aims to promote best practice disposal of waste products both on-site through appropriate maintenance of waste disposal areas and off-site through awarding waste disposal contracts to environmentally responsible companies.

McArthur River Mining is committed to the efficient use of resources and the minimisation of waste production as documented in the McArthur River Mining Environmental Policy and Mining Management Plan. The McArthur River Mining Environmental Management Policy states that MRM will ensure –

"the efficient use of resources and minimisation of waste generation and disposal"

MIM Holdings is a signatory to the Australian Minerals Industry for Code for Environmental Management, which includes waste management commitments.

Waste management is a key component of the environmental section in the general site induction and environmental awareness programs conducted and at McArthur River Mining.

This plans main objectives are to:

- Identify and categorise all wastes produced across McArthur River Mining Leases.
- Identify and characterise disposal and storage areas for each waste category produced.

- Perform risk assessments on all storage, transport and disposal of all waste produced at McArthur River mine-site.
- Ensure appropriate maintenance of disposal areas.
- Ensure appropriate re-use and recycling of specific items.
- Identify feasible waste reduction strategies

2 Waste Production

McArthur River produces many streams of waste due to the diverse range of tasks performed on-site. Below is a list of all major waste types, volumes of waste produced, management issues with each waste type and any guidelines, policies, standards and legislative requirements to manage each waste type.

Generally there are two major forms of waste, contaminated waste and uncontaminated waste. Contaminated waste can be defined as any waste that has come into contact with a contaminant. Contaminants are anything that can cause harm to the environment and commonly include, but are not exclusive to ore, tailings, concentrate, mill reagents and hydrocarbons. Uncontaminated waste is anything that has not come into contact with a contaminant.

2.1 Kitchen (putrescible) waste

Kitchen (putrescible) waste consists of all waste that is produced in the kitchens and crib rooms and is normally of organic origin (ie kitchen scraps). This waste stream has not come into contact with hydrocarbons, concentrate, tailings, ore, reagents or any other contaminant. Currently approximately 600m^3 amount of kitchen waste is produced annually.

2.1.1 Requirement for disposal

McArthur River Mining has made external commitments in the Mine Management plan to dispose of domestic waste (putrescible waste) in a landfill site located above the 1 in 100 year flood level. McArthur River Mining

adheres to ENV SOP 0056 for management of the disposal area for kitchen waste.

2.1.2 Management

The kitchen waste disposal area at the site refuse facility is the disposal location for all kitchen scraps generated at the McArthur River Mine-site, while kitchen waste generated at the Bing Bong Loading Facility is disposed of at the Borroloola waste disposal facility. Maintenance of the domestic waste area of the site refuse facility will be undertaken in is in accordance with the planned procedure *ENV SOP 0056*.

2.2 General waste

General waste consists of all waste packaging, office waste and garden waste. This waste stream has not come into contact with hydrocarbons, concentrate, tailings, ore, reagents or any other contaminant. Currently approximately 2000m^3 amount of general waste is produced annually.

2.2.1 Requirement

McArthur River Mining has made external commitments in the Mine Management plan to dispose of general waste in a landfill site located above the 1 in 100 year flood level. McArthur River Mining adheres to *ENV SOP 0055* for management of the disposal area for general waste.

2.2.2 Management

The general waste disposal area at the site refuse facility is the disposal location for all general waste generated at the McArthur River Mine-site, while general waste generated at the Bing Bong Loading Facility is disposed of at the Borroloola waste disposal facility. Maintenance of the general waste area of the site refuse facility will be in accordance with the planned procedure *ENV SOP 0055*.

2.3 Plant/Contaminated waste

Plant/Contaminated waste consists of any waste product that has come into contact with a contaminant. Contaminated waste generally is produced in the

mill area, the underground, maintenance workshops, in the Bing Bong concentrate shed. Approximately **XXX** of contaminated waste is currently produced annually.

2.3.1 Requirement for disposal

McArthur River Mining has made external commitments in the Mine Management plan to dispose of contaminated waste within a designated area inside the tailings dam structure.

2.3.2 Management

Contaminated waste generated in the mill and underground areas must be stored in designated bins. The Bing Bong Loading Facility has a designated bunker for all storage of contaminated waste. All contaminated waste is transported to and disposed of at the tailings dam tip area.

Mill, underground and Bing Bong areas are responsible for transporting the waste to the tailings dam. Any contaminated waste travelling from the Bing Bong Loading Facility must be covered to prevent any contamination along the Carpentaria Highway. Contaminated waste must be disposed in accordance signage at the tailings dam disposal area. Maintenance of the tailings dam tip will be in accordance with the planned procedure *ENV SOP 0054*.

2.4 Waste Rock

Waste rock is currently generated underground mainly through development. No waste rock is generated on the surface. Approximately 5% (67000 tonnes /year) of all material handled underground is waste rock. Waste Rock during development of the underground was initially stored around the portal to the underground. This material is has been crushed and is gradually being returned to the underground as road base material.

2.4.1 Requirement for disposal

Waste rock is disposed in completed mining pannels underground. This commitment is specified in the Mining Management Plan.

2.4.2 Management

Due to the small percentage of waste rock produced underground there is no shortage of disposal areas. These disposal areas are usually within 400m of the loading point. Waste rock is not brought to the surface.

2.5 Tailings

Tailings is material rejected from the mill after the recoverable zinc and lead have been extracted. Tailings consist of finely ground rock particles that have been contaminated with mill reagents. The tailings are extremely fine with 80% of particles being less than 7µm. Approximately 120000m^3 of tailings are produced annually.

2.5.1 Requirement for disposal

Tailings are disposed in cell one of the tailings dam using three elevated discharge points. This commitment is specified in the Mining Management Plan.

2.5.2 Management

Tailings are currently deposited into cell one of the tailings dam using multiple elevated discharge points. Tailings are pumped as slurry with a solids content of between 45% and 50%. In 2003/2004 it is envisaged that cell one of the tailings dam will be filled. Tailings management strategies regarding tailings deposition and tailings dam capping are detailed in the Life of Mine Plan.

2.6 Liquid waste from the laboratory

The on-site laboratory has various types of liquid hazardous waste from assaying of concentrate, tailings, ore, reagents and waste from scrubbers in ceiling of laboratory. Approximate volumes of reagents washed down the sinks annually are:

Substance	Volume
H_3BO_4	18L
HNO_3	29L

Substance	Volume
HCl	26L
Br	3.5L

2.6.1 Requirement for disposal

Liquid wastes from the laboratory are disposed within the contained internal drainage system.

2.6.2 Management

This waste is flushed down the sink and moves through the drainage system to the concentrator runoff pond (CRP). This waste is diluted in the CRP to harmless concentrations and is fully contained within MRM water management system.

2.7 Medical waste

Medical waste (including sharps containers) is currently produced in the first aid centre mainly from canulation and any bloodied dressings.

2.7.1 Requirement for disposal

There is a legislative requirement in the Medical Waste Interim Policy (1995) to dispose of medical waste off-site. This policy describes how medical waste must be stored, transported and disposed. Australian standard AS3816: 1998 should also be adhered to if relevant

2.7.2 Management

Medical waste is transported in the sharps containers from MRM to Darwin Hospital or incineration. Medical waste is stored, transported and disposed in accordance with procedure *OHS SOP 0013 Disposal of Sharps Containers*.

2.8 Waste oils

Waste oils are generated mainly from the maintenance areas where oils are changed in plant equipment. This includes the mill, underground, Bing Bong maintenance areas and the EDL power plant. Approximately 35% of all oil brought to McArthur River Mining is collected and disposed off-site. The remaining portion of oil is collected in runoff ponds. Approximately 60,000L of oil is collected annually and disposed off-site.

2.8.1 Requirement for storage and disposal

McArthur River Mining has committed to adopting practicable waste recovery and re-use strategies through the Mine Management Plan, the MRM Environmental Policy and the Australian Minerals Industry Code for Environmental Management. Waste oil is an example of a practicable resource that can be re-used off-site.

In addition as a component of McArthur River Mining's environmental management system key environmental performance indicators have been developed. The amount of oil recycled as a percentage of oil used on site is one of these key environmental performance indicators used to assess environmental performance at McArthur River.

2.8.2 Management

Waste oil is currently collected and stored in 1,000L dots for transport and disposal off-site. The underground maintenance area currently uses the majority of oil on-site and therefore recovers the most oil on-site. The planned procedure *ENV SOP 0050* detail the steps associated with waste oils collection and transportation off-site.

2.9 Waste cooking oil

Catering contractors (currently Eurest) currently produce waste cooking oil at the camp kitchen. All waste cooking oil (approximately 4,200L per year) is recycled annually.

2.9.1 Requirement for storage and disposal

McArthur River Mining has committed to adopting practicable waste recovery and re-use strategies through the Mine Management Plan, the MRM Environmental Policy and the Australian Minerals Industry Code for Environmental Management.

2.9.2 Management of waste cooking oil

Waste cooking oil is currently collected and stored in 205L drums behind the camp kitchen. When sufficient drums are full, waste cooking oil is transported

to NT Envirocare in Darwin for recycling. The procedure *ENV SOP 0051* details the process for oil is collection and transportation off-site.

2.10 Aluminium Cans

Aluminium cans are generated at the wet mess at McArthur River Mine and the Bing Bong Loading Facility. Approximately 80,000 aluminium cans are generated annually by McArthur River Mining.

2.10.1 Requirement for storage and disposal

McArthur River Mining has committed to adopting practicable waste recovery and re-use strategies through the Mine Management Plan, the MRM Environmental Policy and the Australian Minerals Industry Code for Environmental Management.

2.10.2 Management

Currently aluminium cans are being collected and donated to the Borroloola Community Government Council. The cans are either collected from the mine by the Council or delivered by the environmental section to Borroloola Community Council Workshop for crushing and dispatched to Simsmetal. The planned procedure *ENV SOP 0052* details the steps associated with aluminium cans collection and transportation off-site.

2.11 Scrap metal

Scrap metal is generated at both at Bing Bong and at the McArthur River mine-site. The scrap metal is mainly produced during shutdowns, in the mill workshop and from Sandvick rock tools.

2.11.1 Requirement for storage and disposal

McArthur River Mining has committed to adopting practicable waste recovery and re-use strategies through the Mine Management Plan, the MRM Environmental Policy and the Australian Minerals Industry Code for Environmental Management.

2.11.2 Management

Currently scrap metal is collected in half height containers that are located in the laydown yard. When these containers are filled they are transported off-site to BG Steel in Mt Isa. The planned procedure *ENV SOP 0053* details the steps associated with scrap metal collection and transportation off-site.

Metal for recycling must not contaminated. That is, it must not be caked with concentrate, tailings or any mill reagent. A logistical hurdle concerns weight of scrap metal that can be loaded into the half height containers. Only 25 tonnes amount of scrap can be loaded into the containers due to weight restrictions on trucks transporting the scrap metal.

2.12 Waste Jet A1 fuel

Jet A1 fuel is used at the airport to fuel the daily charter from MRM to Darwin. The majority of the fuel is pumped back into the fuel tank at the airport, however a proportion of the fuel is not put back into the fuel tank. Approximately five 205L drums are produced annually.

2.12.1 Requirement for storage and disposal

Storage and transport of waste Jet A1 fuel must be in accordance with AS1940 and the MSDS for Jet A1 fuel

2.12.2 Management

Fuel sampled that is not pumped back into the fuel tank is stored in a 205L drum. When the drum is filled it is transported up to the underground mobile maintenance workshop and used as cleaning fluid.

2.13 Malleus GL400 (Blackjack)

Malleus GL400 is used in the mill and used to lubricate the girth gear in the SAG Mill. Approximately eighty 205L drums Malleus GL400 are reclaimed annually.

2.13.1 Requirement for disposal

Malleus GL400 is classed as contaminated waste. McArthur River has committed in the Mine Management Plan to dispose of contaminated waste in the tailings emplacement area.

2.13.2 Management

Waste Malleus GL400 that is collected is shandied into the tailings thickening tanks and pumped to the tailings dam with tailings.

2.14 Sewage

Sewage is currently produced at both the mine-site and the Bing Bong Loading Facility.

2.14.1 Requirement for treatment and disposal

McArthur River Mining has committed to treating sewage in a commercially approved treatment plant.

2.14.2 Management of sewage

Sewage is treated using intermittent extended aeration and settlement. The treated water is then decanted and discharged to land.

2.15 Batteries

Waste batteries are generated at both at Bing Bong and at the McArthur River mine-site. The batteries are mainly produced from mobile equipment and cap lamps.

2.15.1 Requirement for disposal

McArthur River Mining has committed to adopting practicable waste recovery and re-use strategies through the Mine Management Plan, the MRM Environmental Policy and the Australian Minerals Industry Code for Environmental Management.

2.15.2 Management

Waste batteries are currently collected at mobile maintenance and the underground electrical workshop. These batteries are then transported to the stores are and stored until they are dispatched.

3 On-site Waste Management

3.1 Waste Storage

3.1.1 Metallurgy

The Metallurgy Department stores several types of waste products in the mill area. These include tailings, scrap metal, contaminated waste, waste oil and blackjack.

- Contaminated waste is stored in old SIBX containers at various strategic locations around the mill area as shown in Figure 1
- Scrap steel is stored in a small skip bin near the maintenance workshops and in half height containers outside the concentrate shed.
- Blackjack is stored in 205L drums on pallets outside the SAG mill.
- Waste oil is stored in 1000L dots near the workshop area in the mill.

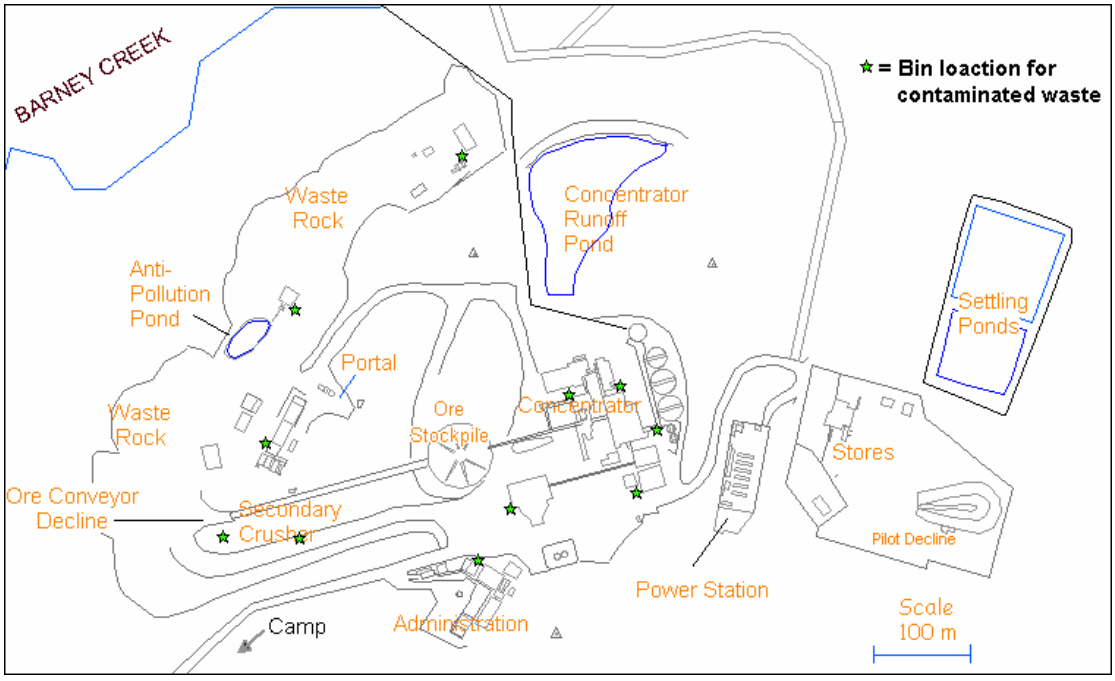

Figure 1. Contaminated waste bins in the mill and underground areas

3.1.2 Mining

The mining department stores several types of waste products in around the underground area. These include scrap metal (used drilling rods), contaminated waste and waste oil.

- Scrap metal is currently stored near the mine services office. This generally consists of used drilling rods. Drilling rods are stacked in piles on the ground while used drilling rod heads are kept in 205L drums.
- Waste oil is stored in a 5,000L tank outside the mobile maintenance workshop.

3.1.3 Bing Bong

The Bing Bong Loading Facility stores contaminated waste and waste oil.

- Waste oil is stored in 1000L dots inside a designated waste oil container adjacent to the fuel bowsers.
- Contaminated waste is stored in a bunker outside Bay C of the concentrate shed.

Figure 2. Contaminated waste bunker at the Bing Bong Loading Facility

3.1.4 MRM minesite Camp

The MRM minesite camp stores waste cooking oil.

- Cooking oil is stored outside the kitchen in 205L drums on pallets.

3.1.5 Stores

The MRM stores area stores waste oil and scrap metal for short periods of time prior to dispatch off-site.

- Waste oils is stored in 1,000L dots in the stores area.
- Scrap steel is stored either on pallets or on in half height containers within the stores area or in the adjacent laydown yard.

3.2 Waste transport

Individual departments/sections are responsible for the transport of waste from their individual areas.

3.2.1 Metallurgy

The reagent-shed operator generally transports contaminated waste from the mill to the tailings dam. Waste is generally transported in the Mill's 7 tonne flatbed truck and is transported weekly.

Scrap metal, waste oil and Malleus GL400 are all transported within the mill area. Transportation of these substances is in the relevant procedures for transport for each material type.

3.2.2 Mining

Waste from the underground is generally transported to the tailings dam by mines services using one of the trucks from the underground. Waste is usually transported weekly using one the truck from the underground. The majority of the waste comes from the maintenance areas.

Scrap metal and waste oil are all transported within the underground area. Transportation of these substances is in the relevant procedures for transport for each material type.

3.2.3 Bing Bong

Transport of the Bing Bong Loading Facility waste is sub-contracted to local operators in Borroloola. These sub-contractors use a cover flatbed truck to transports the contaminated waste from Bing Bong to the tailings dams. Procedure *ENV SOP 0056* explains how waste contaminated waste is transported between Bing Bong and McArthur River Mine.

The planned procedure *ENV SOP 0056* explains how the steps associated with transportation and disposal of contaminated waste from the Bing Bong Loading Facility.

3.3 Disposal Facilities

3.3.1 Tailings Dam disposal area

The tailings dam disposal area is located on the eastern side of the tailings dam in cell two, directly adjacent to cell one (Figure 3). Routine maintenance of the tailings dam disposal area is essential for effective waste management at the site refuse facility. There are signposts that show the location of the waste disposal area and disposal locations. The planned procedure *ENV SOP 0054* explains the steps associated with indicates how the tailings dam waste disposal area is managed.

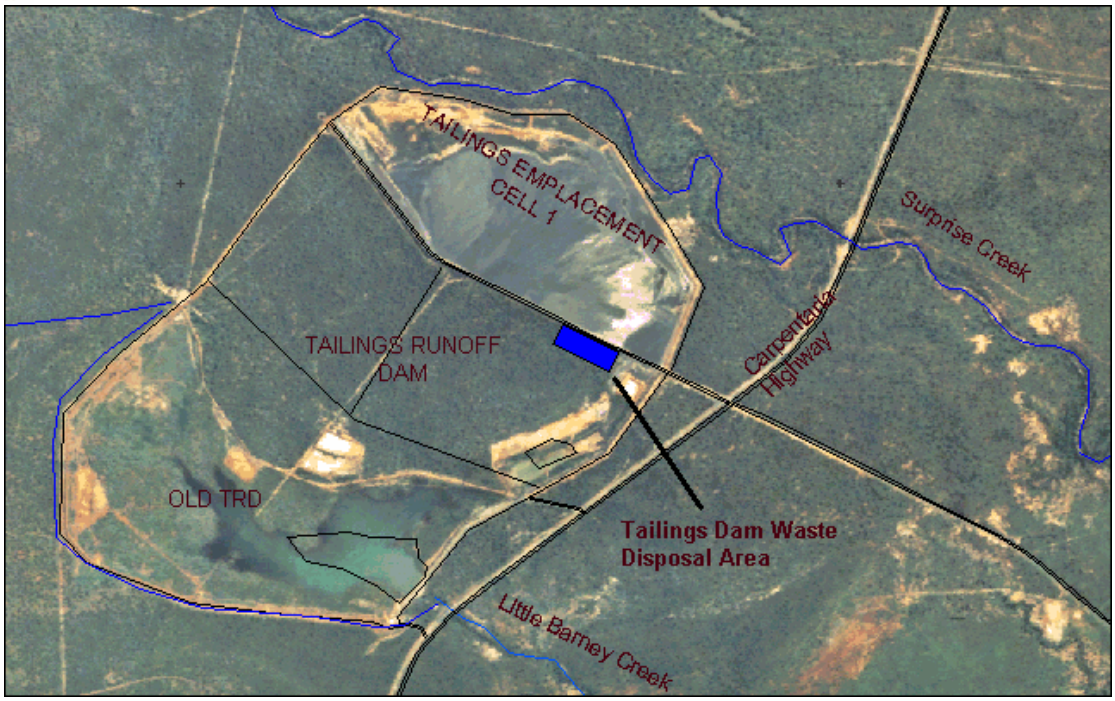

Figure 3. Location of the tailings dam waste disposal facility

3.3.2 Site Refuse Facility

The site refuse facility is located between the camp and mine area as seen in Figure 4. The refuse facility was located here for the following reasons;

- The site is located above RL40m (1/100 year flood level).
- The site is in a disused borrow pit that does not have a steep slope thereby reducing the risk of soil erosion.
- The site has clay rich soils, which are favourable due to their low permeability.
- Suitable all weather road access from the main entrance route from the highway to mine.

Currently there are two main landfill methods employed at the site refuse facility. The trench method and area fill method. The trench method is used for all putrescible waste, while the area fill method is used for all other general waste. Both waste disposal areas have a 2m mesh fence to minimise any material being blown out of the waste refuse facility.

Routine maintenance of the waste refuse facility is essential for effective waste management at the site refuse facility. Within the site refuse facility

different waste types are segregated into different areas. There are two main areas that require routine maintenance, the putrescible waste section (trenches), and the general waste section (area fill method).

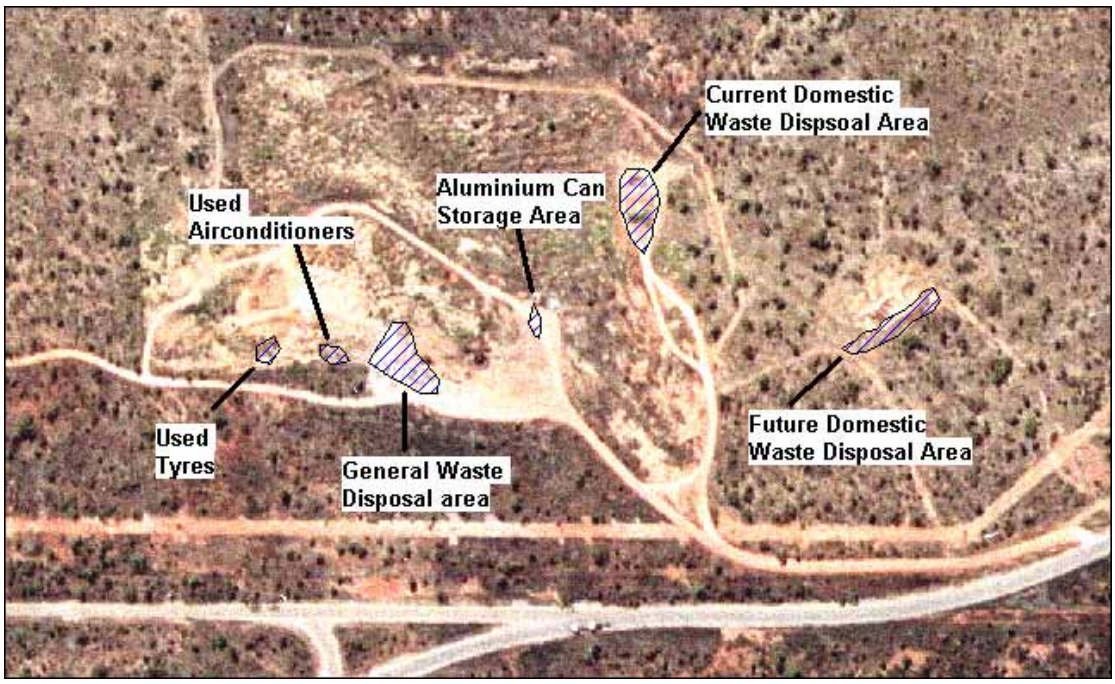

Figure 4. Site refuse facility

3.3.2.1 Kitchen (putrescible) waste disposal area

The kitchen (putrescible) waste disposal area uses the trench method for disposal of waste. The trench method uses a trench that is approximately 3m deep, 5m in width and 20m in length. The refuse in the trench is burned twice daily as described in MRM's Mine Management Plan. This burning must only occur after the morning and nightly charter flights have left the mine. This is to reduce the amount of birds on the runway that the burning attracts. The catering contractor (Eurest) is responsible for the day to day maintenance of this area of the site refuse facility. The planned procedure *ENV SOP 0056* explains the steps associated with maintenance of the putrescible waste disposal area.

3.3.2.2 General waste disposal area

The general waste disposal area uses the area fill method. This is where waste is disposed on the existing ground level and then soil is sheeted over

the top of the waste. This area is maintained on a fortnightly basis. This maintenance includes the pushing of waste over the dumping face that has not been pushed over and the sheeting of waste with a minimum of 150mm of soil.

The Environmental Superintendent is responsible for the maintenance of this area of the site refuse facility. The planned procedure *ENV SOP 0055 e*xplains the steps associated with maintenance of the general waste disposal area.

To ensure that maintenance of the general waste disposal area is minimised there are signposts showing the appropriate dumping area, and signs that clearly define the types of waste allowed to be disposed of at the site refuse facility (ie non-contaminated waste).

4 Off-site Waste Management

Currently several waste products from McArthur River Mining are transported off-site for disposal or recycling. McArthur River Mining recycles and disposes waste material off-site because it prolongs the lifespan of waste disposal facilities on-site. Recycling is also a key component of waste minimisation which is a concept MRM has committed to in the Mine Management Plan, MRM Environmental Policy and the Australian Minerals Industry for Code for Environmental Management. Materials that MRM currently sends off-site for recycling or off-site disposals are,

- Aluminium cans,
- Scrap steel,
- Waste cooking oil,
- Waste oil,
- Medical waste

All these wastes have relevant procedures for the collection, storage and dispatch. All items except aluminium cans are transported off-site through the stores. The Stores Section organises appropriate transport for each material

type. All material that stores dispatch for off-site disposal travel via road transport except medical waste. Medical waste is transported via air to Darwin. When dispatching of waste off-site refer to the relevant procedures that are listed in Table 1. Aluminium cans are either transported to Borroloola by the environment section or picked up by a representative from the Borroloola Community Government Council.

4.1 Waste management contractors details

Product	Company/ Organisation	Procedure	Contact Details
Aluminium cans	Borroloola Community Government Council	*ENV SOP 0052*	Stan Allen Borroloola Community Government Council Ph(w): (08) 8975-8820 Ph(a/h) (08) 8975-8839
Scrap metal	BG Steel Mt Isa	*ENV SOP 0053*	19 Duchess St Mt Isa QLD 4825 Ph(w): (07) 4743 5570
Waste cooking oil	NT Envirocare	*ENV SOP 0051*	5 Dennis Ct Berrimah, NT 0828 Ph(w) (08) 8947-2688 Fax(w) (08) 8947-2678
Waste oil	Shell, Mt Isa	ENV SOP 0050	Sirpa Ph(w) (07) 4743-2488
	NQRR	*ENV SOP 0050*	Bruce Ph(w) (07) 4774-7333
Medical waste	Royal Darwin Hospital	*OHS SOP 0013*	Joan (from sterilisation) Ph(w) (08) 8922-8888

Table 1. Contact details for off-site disposal and recycling

5 Risk Assessment of storage, transport and disposal of waste

The assessment of all risk posed by the storage, transport and disposal of waste is a key component in the process of improving waste management at McArthur River Mining. All waste management practices are assessed annually in this document on their potential environmental risk.

In order to access the environmental risk of each activity it is necessary to identify the likelihood and the consequence of either the storage, transport or disposal of each waste stream. The likelihood and consequence are calculated using the criteria in Table 2 and Table 3. Once the likelihood and consequence have been calculated each activity can be risk ranked using the MRM risk ranking matrix (*MRM SOP 0026D*) (Figure 5).

While assessing risk of waste management practices all control strategies are taken into account. These control strategies reduce either the likelihood or the potential consequence of the risk. Control strategies may include, but are not limited to implementation of procedures, adherence to guidelines, standards, legislation, routine maintenance, monitoring, long term mine planning.

Low	Minor	Moderate	Major	Catastrophic
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**
▪ No lasting effect. ▪ Low-level impacts on biological or physical environment ▪ Limited damage to minimal area of low significance.	▪ Minor effects on biological or physical environment. ▪ Minor short-medium term damage to small area of limited significance.	▪ Moderate effects on biological or physical environment but not affecting ecosystem function. ▪ Moderate short-medium term widespread impacts (eg. oil spill causing impacts on shoreline).	▪ Serious environmental effects with some impairment of ecosystem function (eg. displacement of a species). ▪ Relatively widespread medium-long term impacts.	▪ Very serious environmental effects with impairment of ecosystem function. ▪ Long term, widespread effects on significant environment (eg. unique habitat, National Park).

Table 2 . Environmental consequence of an action or in-action

A	B	C	D	E
Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Almost Certain (Daily or less)	Likely (Weekly, not > 4 times per month)	Occasional (Monthly not > 12 per year)	Unlikely (Annual not > 5 times in 5 years)	Rare (Once per 5 years)

Table 3. Likelihood of an environmental risk

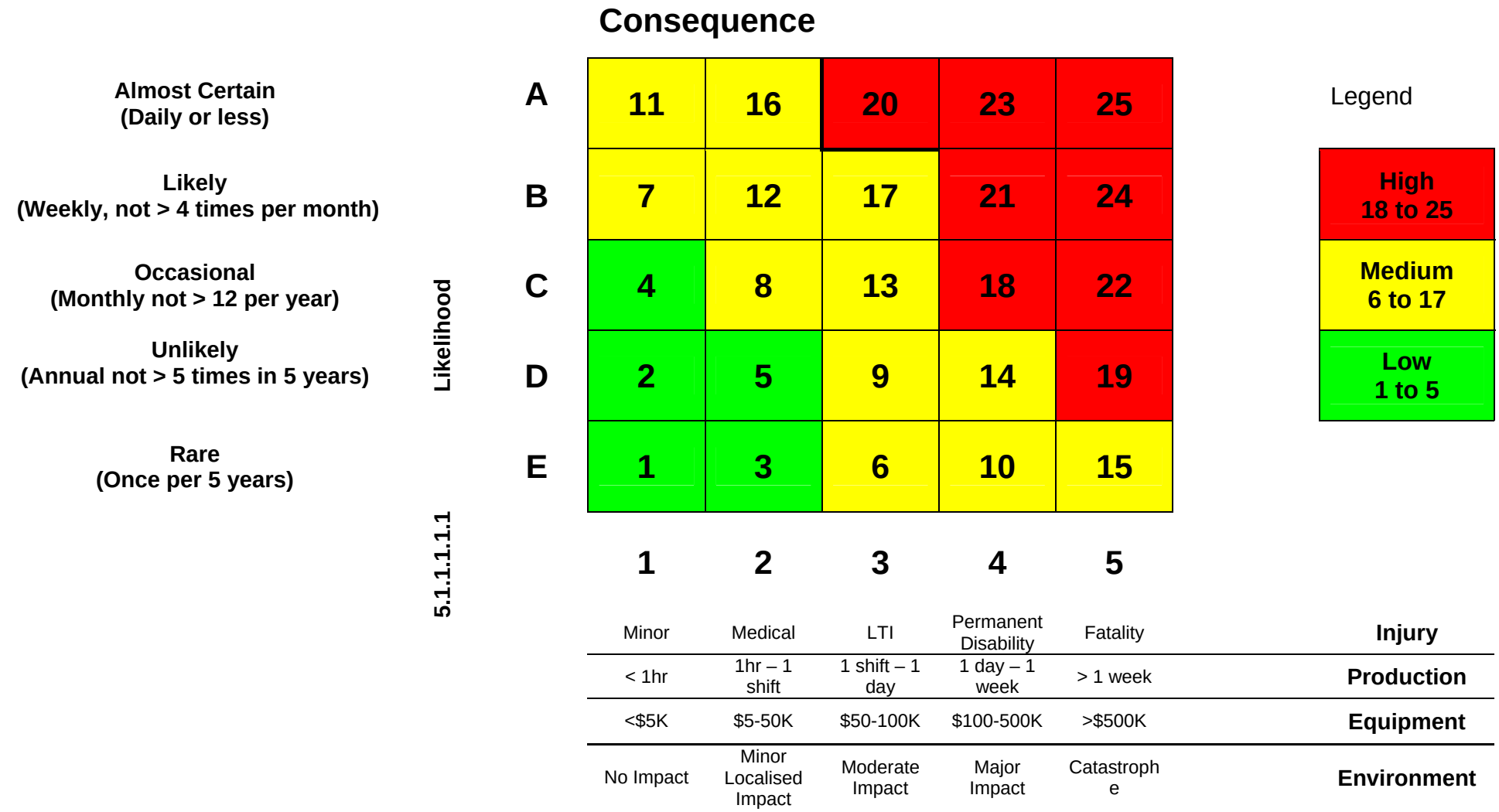

Figure 5. MRM Risk Ranking Matrix

5.1 Risk assessment

In Table 4 current waste storage, transport and disposal practices have been assessed for environmental risk. These waste management practices have been ranked in order of their environmental risk. This table includes current control strategies to reduce the environmental risk and potential actions that could further reduce the environmental risk.

The largest environmental risk associated with waste management at McArthur River Mining is the disposal of tailings into the cell one of the tailings dam. This risk has been partially realised with seepage of water with high concentrations of sulphates into the surrounding groundwater table. This risk has been identified and current works are on going to remedy the impact seepage from the tailings dam. Currently control strategies include on-going monitoring of groundwater surrounding the tailings dam and periodical. The future management of the disposal of tailings into cell one of the tailings dam is the formulation of a specific environmental management plan.

All other risks associated with waste management have been ranked as low in the MRM risk ranking matrix. These risks are unlikely to cause environmental harm. However some actions have been identified to further reduce risk posed by these waste management practices. These mainly consist of formalisation of procedures, the implementation of these procedures and the construction of bunded areas for storage of hazardous substances (ie hydrocarbons).

Table 4. Risk assessment of waste management practices

WASTE MANAGEMENT ACTION	CURRENT RISKS	CURRENT CONTROL MEASURES	CONSE-QUENCE	LIKELI-HOOD	RISK RANKING	POTENTIAL ACTIONS TO MINIMISE RISK
Disposal of tailings in cell one of tailings dam	▪ Contamination of groundwater ▪ Contamination from dust ▪ Failure of tailings dam wall ▪ Water management ▪ Disturbance ▪ Post mining land form	▪ HEM and EM38 Surveys ▪ Routine monitoring of groundwater	3	5	20	▪ Requires a specific environmental management plan
Transport of contaminated waste at tailings dam disposal area	▪ Contamination along transport route	▪ Vehicle cleaning standards ▪ Restricted access	1	3	4	▪ Construction of wheel wash on back road to tailings dam ▪ Investigations into current contamination along route to tailings dam
Disposal of kitchen waste in trench at site refuse facility	▪ Potential for disease ▪ mosquito born virus's ▪ disturbance to land ▪ groundwater seepage ▪ Feral animals (cats)	▪ Daily burning, covering ▪ Clay lining ▪ Above 1 in 100 year flood level ▪ Adhering to standards ▪ Progressive rehabilitation ▪ 2m mesh fence	2	1	3	▪ Formalised procedures for tip management ▪ Waste management planning
Disposal of general waste at site refuse facility	▪ disturbance to land ▪ groundwater seepage ▪ Rubbish blowing around	▪ Signage, environmental awareness training ▪ 2m mesh fence ▪ ad hoc maintenance ▪ regular covering ▪ Progressive rehabilitation	2	1	3	▪ Formalised procedures for tip management ▪ Routine maintenance scheduling ▪ Waste management planning
Storage of waste oil in stores lay-down area	▪ Contamination off-site	▪ designated area for storage	2	1	3	▪ Hydrocarbon management standard ▪ Construction of a bunded area for storage of hydrocarbons

WASTE MANAGEMENT ACTION	CURRENT RISKS	CURRENT CONTROL MEASURES	CONSE-QUENCE	LIKELI-HOOD	RISK RANKING	POTENTIAL ACTIONS TO MINIMISE RISK
Disposal of waste water from the sewerage treatment plant in bush	▪ Biological and chemical loading of bush	▪ Primary treatment	2	1	3	▪ Investigation into current disposal methods and impacts
Disposal of waste sludge from the sewerage treatment plant in bush	▪ Biological and chemical loading of bush	▪ Primary treatment	2	1	3	▪ Investigation into current disposal methods and impacts
Storage of scrap metal in half height containers	▪ Off-site contamination	▪ Some scrap metal is stored in internally draining catchments ▪ Some scrap metal is cleaned	1	2	2	▪ Formalise procedures for cleaning scrap metal ▪ Designated storage areas
Transport of contaminated waste from Bing Bong to tailings dam disposal area	▪ Contamination of highway ▪ Risks associated with spill	▪ Covering of waste on truck ▪ Road rules	1	1	1	▪ Awareness training at Bing Bong and for drivers
Transport of tailings in pipeline to tailings dam	▪ Rupture of pipeline	▪ Routine checks ▪ Maintenance	1	1	1	▪ Review routine maintenance procedures
Storage of waste oil in Mill, underground and Bing Bong areas	▪ Minor contamination of lay-down areas	▪ Placement of all oils in internally draining or contained areas	1	1	1	▪ Hydrocarbon management standard
Transport of waste oil off-site	▪ Risk of accident causing localised contamination	▪ contractor management,	1	1	1	▪ Waste tracking certificate
Storage of waste cooking oil outside the kitchen	▪ Spillage	▪ low volume storage ▪ Designated area	1	1	1	
Transport of waste cooking oil off-site	▪ Spillage		1	1	1	

WASTE MANAGEMENT ACTION	CURRENT RISKS	CURRENT CONTROL MEASURES	CONSE-QUENCE	LIKELI-HOOD	RISK RANKING	POTENTIAL ACTIONS TO MINIMISE RISK
Loading of scrap metal in half height containers	▪ Contamination,	▪ Cleaning of scrap metal in internally draining catchment	1	1	1	▪ Formalise procedures for cleaning of scrap metal
Transport of scrap metal in half height containers	▪ Off-site contamination	▪ Ad hoc cleaning of scrap metal prior to transportation	1	1	1	▪ Implementation of formalised cleaning procedures
Storage of waste Jet A1 fuel at airport	▪ Localised contamination	▪ Minimise storage volume ▪ Maximisation of recycling of Jet A1 fuel	1	1	1	
Transport of Jet A1 fuel from airport to underground mobile workshop	▪ Spillage of small volumes		1	1	1	
Storage of waste Malleus GL400 (Blackjack) outside SAG Mill	▪ Minor contamination of mill area		1	1	1	
Transport and disposal of Blackjack into tailings thickening tanks	▪ Minor contamination of mill area		1	1	1	
Treatment of sewerage	▪ Spillage of untreated sewerage ▪		1	1	1	
Disposal of contaminated waste at tailings dam disposal area	No significant environmental risk	▪ Ad hoc maintenance of tailings dam tip ▪ Segregated/bunded waste area ▪ Restricted access	1	1	1	▪ Formalised disposal procedures
Disposal of waste rock underground			0	0	0	

WASTE MANAGEMENT ACTION	CURRENT RISKS	CURRENT CONTROL MEASURES	CONSE-QUENCE	LIKELI-HOOD	RISK RANKING	POTENTIAL ACTIONS TO MINIMISE RISK
Disposal of liquid hazardous down sink in laboratory	▪ Safety risk, no environmental risk perceived		0	0	0	
Disposal of medical waste off-site	▪ No environmental risk		0	0	0	
Transport of medical waste off-site	▪ Safety risk, no environmental risk perceived		0	0	0	
Disposal of waste cooking oil off-site	▪ No significant environmental risk		0	0	0	
Transport of aluminium cans to Borroloola	No significant environmental risk		0	0	0	
Disposal of aluminium cans at Borroloola	No significant environmental risk		0	0	0	
Disposal/recycling of scrap metal off-stie	No significant environmental risk		0	0	0	
Use of Jet A1 fuel as a cleaning fluid	No significant environmental risk		0	0	0	
Disposal of blackjack with tailings in cell one of tailings dam	No significant environmental risk		0	0	0	

6 Waste Management Continuous Improvement at MRM

The aim of this management plan is to promote best practice disposal of waste products. Two objectives form this plan that address this aim are,

- Perform risk assessments on all storage, transport and disposal of all waste produced at McArthur River mine-site.
- Identify feasible waste reduction strategies

Performing risk assessments on current waste management practices is an ideal method in planning for improvements. Actions to minimise current risks have been formulated. Actions have been listed and priorities in Table 5. These actions will be incorporated into the site and departmental environmental management plans.

Table 5 . Prioritised actions for waste management continuous improvement

PRIORITY	ACTION	DEPARTMENT/ SECTION RESPONSIBLE	DATE ACTION OT BE COMPLETED
1	Tailings seepage management plan	Environment	30/6/2003
2	Construction of second wheel wash near reagent shed	Environment/ Metallurgy	30/6/2003
3	Formalised procedures for routine maintenance of tailings dam disposal area – include possible segregation of waste streams	Metallurgy	
4	Major works at tailings dam disposal area	Environment	1/10/2002
5	Formalised procedures for maintenance of general waste area of the site refuse facility	Environment	30/6/2002
6	Formalised procedures for maintenance of kitchen waste disposal area of the site refuse facility	Community Relations	
7	Hydrocarbon management standard	Environment	
8	Soil survey along trucking route to the tailings dam to assess contamination.	Environment	1/10/2002
9	Investigation into disposal if waste water from the sewage treatment plant	Environment	30/6/2002
10	Investigation into disposal if waste sludge from the sewage treatment plant	Environment	30/6/2002
11	Awareness training for drivers transporting contaminated waste from Bing Bong to MRM	Environment	1/8/2002
12	Formalisation of procedures for collection, storage and dispatch of scrap steel	Environment/ Stores	30/7/2002

13	Review routine maintenance procedures for the tailings pipeline	Metallurgy	
14	Hazardous waste tracking certificate for hazardous material transported into QLD	Environment/ Stores	
15	Formalisation of procedures for collection, storage and dispatch of waste oil	Environment	30/6/2002
16	Formalisation of procedures for collection, storage and dispatch of waste cooking oil	Environment	30/6/2002
17	Formalisation of procedures for collection, storage and dispatch of waste batteries	Environment	30/7/2002
18	Designation storage area for scrap steel bins	Mining/ Metallurgy	
19	Formalisation of procedures for cleaning of scrap metal	Environment	30/7/2002
20	Bunding of storage area of hydrocarbons in stores laydown yard	Stores/ Environment	
21	Formalisation of procedures for collection, storage and dispatch of aluminium cans	Environment	30/6/2002
22	Training of relevant staff in correct use of tailings dam tip area	Metallurgy/ Mining	
23	Formal definition of specific accountabilities for relevant disposal areas	Management team	
24	Formalised procedures for transport of contaminated waste from Bing Bong to tailings dam	Environment/ Bing Bong	
25	Formalised procedures for transport of contaminated waste from mine to tailings dam	Environment/ Mining/ Metallurgy	