Mine Closure Plan
Mud Tank Operation
MIN 165

Document ID: EN041 – MCP
Version 2

September 2013

Prepared for Australian Vermiculite Industries

By Ensolve Pty Ltd

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FIGURES

DEFINITIONS AND ABBREVIATIONS

AVI	Australian Vermiculite Industries
DME	NT Department of Mines and Energy
EPBC	*Environment Protection and Biodiversity Conservation Act 1999*
EWP	Early Works Plan
MCP	Mine Closure Plan
MMA	*Mining Management Act 2001*
MWD	Mineral Waste Dump
PER	Preliminary Environmental Review
ROM	Run of Mine

Clean Waste[1] - Material that when discharged into the environment, will not pose a risk to people or the environment, and includes natural materials such as clay, soil, rock and other materials such as concrete, brick or demolition products that are free of:

- combustible, putrescible or degradable components;
- hazardous substances or materials (such as municipal solid waste) likely to create leachate by means of biological breakdown;
- any products or materials derived from hazardous waste treatment, stabilisation or disposal practices;

[1] Guidelines for the sitting, design and management of solid waste disposal sites in the Northern Territory

- materials such as medical and veterinary waste, asbestos or radioactive substances that may present a risk to human health if excavated; and
- contaminated soil and other contaminated materials.

Toxic Waste[2] – Means materials by which the adverse effects caused by a toxin (poison) that, when introduced into or absorbed by a living organism, destroys life or injures health. Acute toxicity means the effects that occur a short time following exposure to the toxin, and chronic toxicity means the effects that occur either after prolonged exposure or an extended period after initial exposure.

[2] Guidelines for the sitting, design and management of solid waste disposal sites in the Northern Territory

1. PURPOSE AND SCOPE

This Mine Closure Plan (MCP) has been prepared for the Mud Tank Project (Mud Tank) located 150 kilometres north of Alice Springs in the Northern Territory of Australia on Mining Lease 165. The project is owned and operated by Australian Vermiculite Industries (AVI), a wholly owned subsidiary of Imerys Mineral Australia (Imerys).

Mining of vermiculite ore commenced in 1998 and operations currently consist of two decommissioned pits, a dry beneficiation processing plant, and supporting mine infrastructure including an on-site camp.

The MCP prepared in line with the closure guidelines as outlined in section 10.1 and has been prepared to assist AVI in closing of the Mud Tank Project in an ecologically sustainable manner, consistent with agreed post-mining outcomes and land uses.

This document, through its preparation and submission satisfies the conditions placed on the Mud Tank tenement, requiring a MCP to be provided to the Department of Mines and Energy (DME) by 30 June 2013.

2. PROJECT OVERVIEW

2.1. OWNERSHIP

The Mud Tank Vermiculite project (Mud Tank Project) is located approximately 150 kilometres north of Alice Springs on the Plenty Highway in the Northern Territory of Australia on Mining Lease MLS 165.

Mining of Vermiculite ore commenced in 1995 and operations currently consist of two decommissioned pits, a dry beneficiation processing plant, and supporting mine infrastructure including an on site camp.

All compliance and regulatory requirements regarding this assessment document should be forwarded by email, fax, post or courier to the following address:

Postal Address:
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C-/ Imerys Minerals Australia
3610 Glenelg Highway
Pittong
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Australia

Contact:
Mr Colin Bullen
General Manager Imerys Minerals Australia
Telephone: 613 5344 6688
Facsimile: 613 5344 6680

2.2. LOCATION, ACCESS AND TENURE

Mining lease 165 is situated within the NT Crown Land Portion 3790 designated as a gemstone fossicking reserve. MLS 165 was excised from portion 3790 in 1995 to allow commencement of mining. It was agreed that upon completion of mining, the land would be returned to NT land portion 3790. The area is surrounded by Alcoota Pastoral Lease.

An overview of the Mud Tank Project layout, tenements and access is presented in the figures below.

Figure 1 - Location Plan

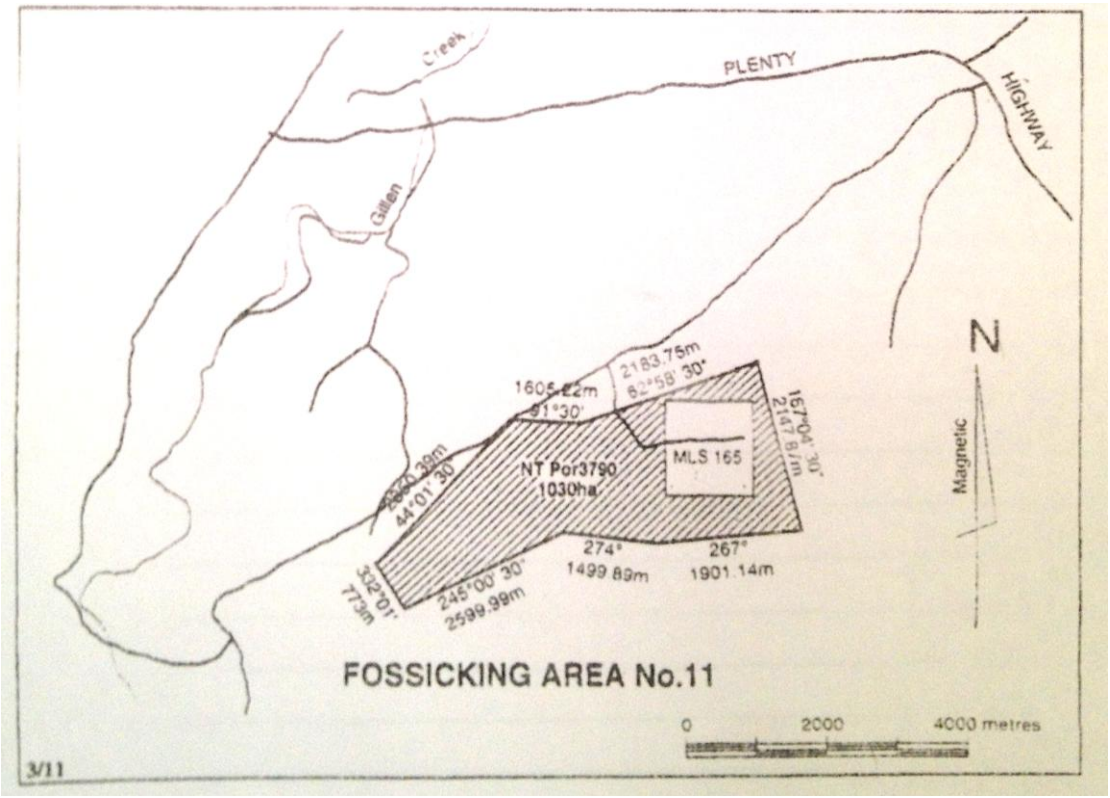

Figure 2 - MLS 165 within NT Portion 3790

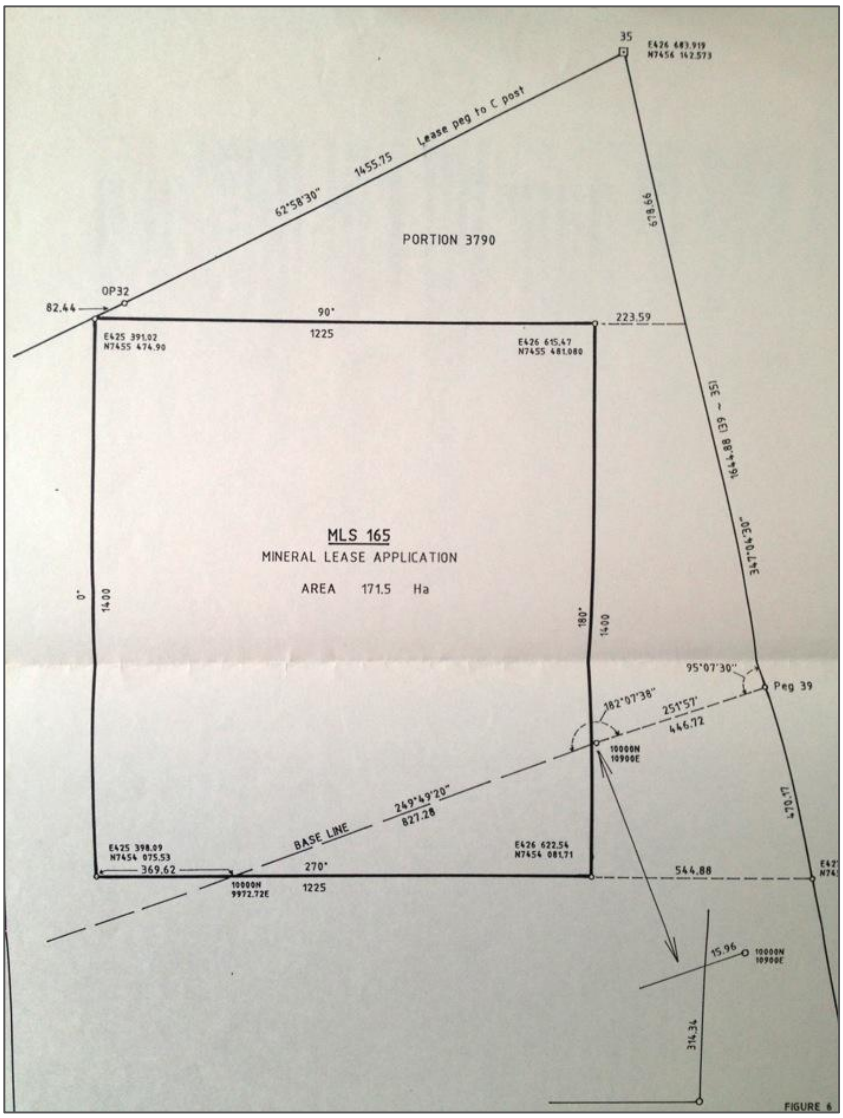

Figure 3 - Tenement Lease

2.3. MINING OPERATION OVERVIEW

Vermicuilte is mined by open pit method and after extraction, is crushed and upgraded to a concentrate by dry processing methods. The concentrate contains around 95% vermiculite flake compared with a range of 25-70% in the original deposit. The concentrate is graded and marketed according to flake size, with the larger flake grades (+4mm) commanding higher prices.

Secondary processing of the concentrate involves exfoliation, which takes place in plants located close to the final market. Exfoliation is achieved by flash heating in a furnace, a process taking only a few seconds, which increases the volume by 10 times or more, simultaneously decreasing bulk density from around 110kg/m3 in the concentrate to 80-120kg/m3 in the final product.

2.4. MINING OPERATION INFRASTRUCTURE

The mine has reached the end of mine life with ore stocks depleted in 2013. The remaining infrastructure components of the Mud Tank Project considered in this MCP are:

- Decommissioned pit A – mined to a final depth of approximately 30 metres.
- Decommissioned pit B – mined to a final depth of approximately 20 metres.
- Run of Mine (ROM) pad.
- Topsoil stockpiles.
- Two mineral waste rock dumps (Old and New).
- Diesel power generator.
- Production Water Bore.
- Decommissioned monitoring bore.
- Haul roads and other access roads.
- Laydown area.
- Accommodation camp facilities.
- Airstrip.
- Overburden stockpile Pit A.
- Overburden stockpile Pit B.
- Landfill.

The decommissioning of processing plant infrastructure including screens, furnace, wind tunnels, sheds and offices have been addressed in the approved Early Works Plan.

2.5. SITE HISTORY

The Mud Tank project was approved under the Preliminary Environmental Review (PER) in 1995 with a projected 20-year life of mine. Pre-strip mining commenced in 1996 with the first sale of vermiculite ore from the project also occurring in 1996. Mining of Pit A ceased in 2003 with the commencement of mining Pit B in February 2010 through to completion in May 2010. The ore extracted from the open pits was stockpiled and stockpiled for processing. Processing of the ore occurred progressively for the following seventeen years until the majority of ore stocks were depleted and it become economically unviable to continue processing in 2013.

An Early Works Plan (EWP) was submitted to DME in April 2013 and approved in June 2013 detailing the works to occur prior to the execution of the MCP. The EWP included the following activities only: plant and general infrastructure dismantling; dismantle main plant building and annexe; equipment dismantle pack and ship to Imerys Pittong site Victoria; remove plant dryers; remove camp facilities; and remove materials in laydown yard. Earthworks and land rehabilitation are addressed under this MCP.

2.6. PAST LAND USE AND CLOSURE OBJECTIVES

The predominant pre-mining land use was gemstone fossicking and cattle grazing. MLS165 lies within a fossicking reserve and the reserve is situated within a pastoral area. The land both historically and present is highly disturbed from both the fossicking and grazing activities. It is anticipated that the dominant post-mining land use will a combination of both fossicking

and grazing. The initial post-mining objective is to stabilise and make all areas safe. Secondary values including the promotion of ecological values/revegetation and visual amenity will be encouraged thereafter.

The key environmental values that have been considered in relation to closure include:

- The health and safety of people
- The creation of safe, stable and non-polluting landforms
- Understanding pit water quality
- Impacts of fossicking and grazing on rehabilitation efforts

2.7. MUD TANK CLOSURE DOMAINS

The mud tank operation has been divided into mine closure domains as listed in table 1 and presented in figure 4.

Table 1 - Mine Closure Domains

Domain	Area (Ha)
Domain 1: Miscellaneous Surface Infrastructure (roads, water bore)	ML roads 4.13km Fossickers roads 2.57km
Domain 2: Process Plant	0.91
Domain 3: Final Product Handling Area	1.63
Domain 4: ROM	6.89
Domain 5: Waste Rock Dumps	4.23 (New – 1.72) (Old – 2.51)
Domain 6: Open Pit (Pit Lake)	4.20
Domain 7: Open Pit (Pit B)	0.73
Domain 8: Accommodation / Site Camp	0.70
Domain 9: Airstrip	2.50
Domain 10: Overburden Stockpile Pit A	1.27
Domain 11: Overburden Stockpile Pit B	0.85
Domain 12: Landfill	0.02

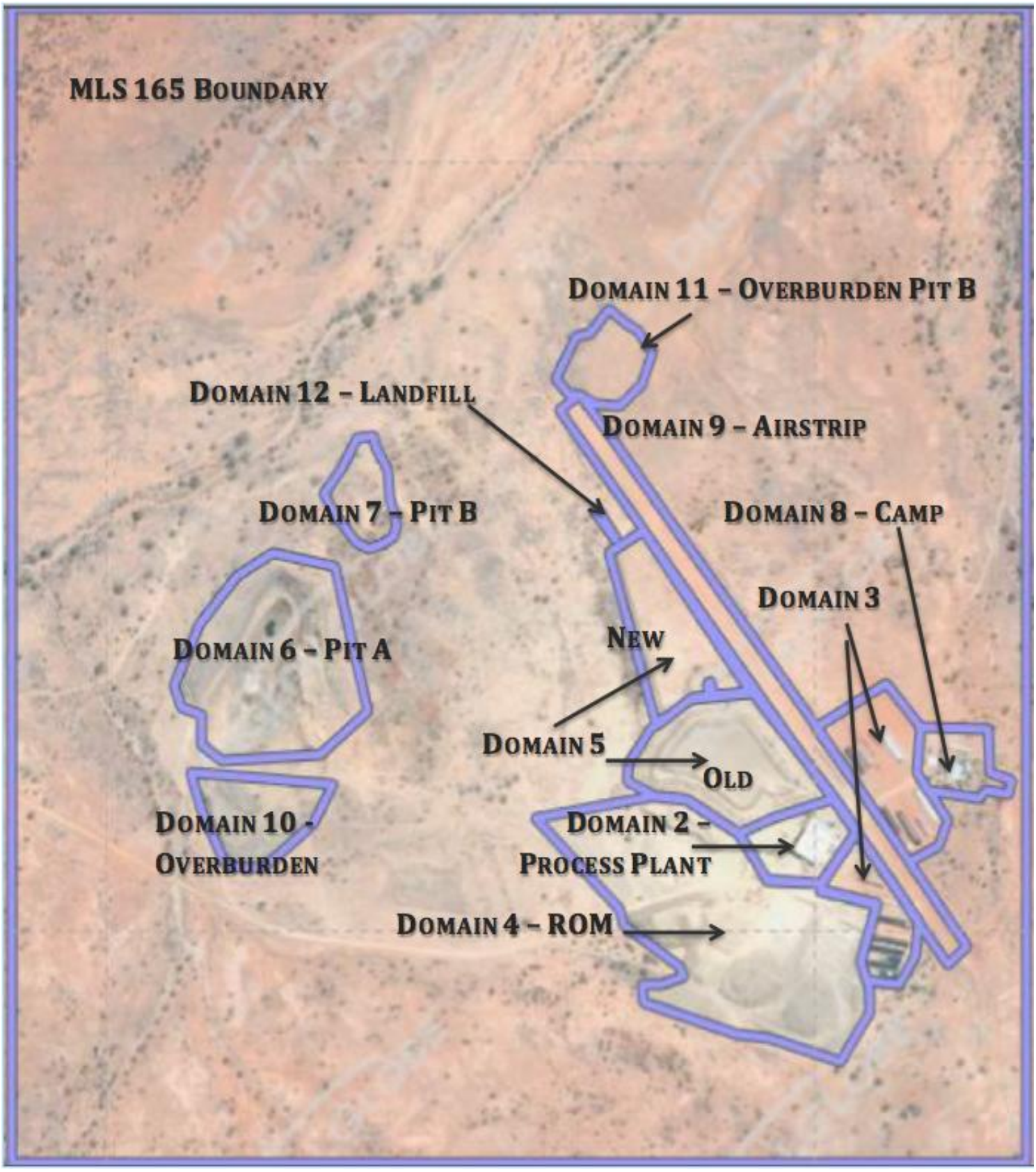

Figure 4 - Mud Tank Closure Domains

3. IDENTIFICATION OF CLOSURE OBLIGATIONS AND COMMITMENTS

3.1. OVERVIEW

Northern Territory mining operations are regulated by the Mining Management Act 2001 (MMA) and administered by the NT Department of Mines and Energy (DME).

This section details the relevant legal requirements pertaining to the closure of the Mud Tank Project. Whilst every effort has been made to identify relevant legislation and approvals, this document has not been reviewed by legal representation; therefore this list should not be relied upon as a full and comprehensive list of legal obligations.

3.2. LEGISLATION AND APPROVALS

3.2.1. ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

The Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) has established a nationally consistent framework for environmental assessment of new projects and variations to existing projects. Mining projects that have the potential to impact on matters of national environmental significance are assessed under this legislation. Issues related to mine closure are considered during the assessment process for mining proposals referred under the EPBC Act.

As requested by DMP, a review of the Mud Tank site in accordance with the EPBA Act has found that six species of significance occur in the area. This report has been appended as Appendix 2.

3.2.2. MINING MANAGEMENT ACT 2001

The *Mining Management Act 2001* regulates mining leases, licences, terms and conditions for mines on private and Crown land; surrender of tenements; regulations; litigation; and administration of justice issues. The DME is the lead regulator and decision-making authority for mining projects in the Northern Territory under the *Mining Management Act 2001*.

The Mud Tank project operates in accordance with tenement conditions set for MLS 165 approved in 1995 under the *Mining Management Act 2001*. All works associated with mine closure will be completed in accordance with the tenement conditions.

3.2.3. ENVIRONMENTAL ASSESSMENT ACT 2013 - PRELIMINARY ENVIRONMENT REVIEW – MUD TANK 1995

The Environmental Assessment Act 2013 (EA Act) provides for the prevention, control and abatement of pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment.

The Mud Tank project was approved through a Preliminary Environmental Review (PER). Information gathered as part of the PER has been utilised to inform the MCP and to ensure that the work completed prior to the commencement of mining can be utilised.

3.2.4. PROJECT APPROVAL CLOSURE CONDITIONS

Decommissioning and closure commitments for the Mud Tank project are detailed in table 2. Please note that not all tenement conditions are listed in table 2 only those relevant to closure are discussed.

Table 2 - Project Approval Closure Commitments

Commitment	Source	Reference
The Lessee shall conduct its operations on the Lease in substantial accordance with the commitments made in the PER and subsequently the EMP, to monitor and protect the local environment and to rehabilitate the project site	MLS165	9.1
Upon completion of the mine the removal of all plant and equipment from the site is required	PER 1993	9.0
Topsoil will be removed and stockpiled for future use in rehabilitation	PER 1993	4.3.1
The removal, transport and placement of zircon-bearing overburden according to agreed procedure	PER 1993	4.3.1
Topsoil will be utilised immediately wherever possible in rehabilitation or other environmental improvements and zircon-bearing overburden will be stockpiled for future use	PER 1993	4.6
Waste dumps will be progressively rehabilitated	PER 1993	4.6
The water bore will be cased, securely capped and backfilled if no longer required (Ownership of bore transferred to Alcoota Station)	Bore completion report	Bore Report 16676 item 6

4. COLLECTION AND ANALYSIS OF CLOSURE DATA

4.1. ENVIRONMENTAL DATA

4.1.1. REGIONAL SETTING AND TOPOGRAPHY

The leased area is centred on the landform know as Zircon Hill. Zircon and Specimen Hills rise to about 10m above alluvial flats along and to the north of Marktree Creek. Marktree Creek drains into Waite Creek; all form part of the major drainage basin of the Sandover River. The creek and smaller tributary drainage channels carry water during brief periods after rains.

Much of the surface of the higher parts of Zircon Hill was historically disturbed by the activity of zircon fossicking. Further disturbance of this area has not occurred as a result of mining activities; as the mining of vermiculite did not occur in this area. Vermiculite extraction took place on the flanks of the hill and remains a visible disturbance to the natural topography in this area.

4.1.2. GEOLOGY

The geology of the carbonatite complex has been studied intermittently over the past fifty years and was investigated in detail by Blue Circle during the evaluation stage of developing the vermiculite potential.

The carbonatite complex consists of early mafic to intermediate rock types that have been altered to mica rich assemblages by hydrothermal activities, mainly associated with intrusions of series of carbonate dominated plugs, dykes and still like intrusives.

Vermiculite is a form of mica. As such is has a typical flaky habit but is characterised by the presence of water in the lattice structure which gives it the ability to exfoliate rapidly on heating. Although there are several mineral species within the vermiculite group most commercial vermiculite has a two layer structure comprising minerals such as hydrobiotite, chlorite or smectite.

Vermicuilte is commonly associated with rocks such as carbonatite and pyroxenite and is usually formed by wither weathering or hydrothermal alteration of other forms of mica such as biotite. If weathering is involved in the formation of vermiculite its commercial properties are usually only of near surface extent and decrease with depth. Few occurrences are of major lateral extent and many comprise only dykes of limited dimensions and variable quality[3].

[3] Mud Tank PER 1993

Exploration of the vermiculite deposits at Mud Tank was undertaken by excavation of approximately seven kilometres of shallow costeans, drilling of fifteen 750mm diameters bucket auger holes to a minimums depth of 27m, excavation of 10 bulk samples for testing in a commercial exfoliators, excavation of a large bulk sample for on-site crushing tests and screened concentrate production and extensive channel sampling of costeans.

4.1.3. PAST LAND USE

For some 40 years or so the Mud Tank area, in particular Zircon Hill, has been an important source of gem quality zircon; the presence of zircon in the area has been known for possibly 70 years of more. Zircon mining has occurred on a semi-commercial fossicking scale usually from surface to 1-2 metres in depth.

Zircon occurrence is widespread but significant concentrations are found only in secondary deposits overlying the carbonate-dominated bodies, the adjacent vermiculite and in modern creeks. Significant primary concentrations have been found associated with magnetite and apatite rich zones in the main carbonate plug on Zircon Hill. As outlined in the PER this material was stripped and stockpiled and later respread for fossicking.

Cattle grazing by neighbouring Alcoota station occurred historically in the area, at the time of project approval the fossicking reserve portion was excised from the wider Alcoota Station land portion.

4.1.4. CLIMATE

Mud tank lies in an area in central Australian classified as Arid Zone. The Bureau of Meteorology (BOM) station maintaining full long-term climatic date is located at Alice Springs Airport (station ID 15590). The nearest BOM station collecting rainfall data is located at Gemtree Caravan Park (station ID 15653). Relevant data from these stations has been utilised throughout this MCP.

A summary of key climatic data from the Alice Spring station is present in the table below. The rainfall data has been based on data from the Gemtree station. The average annual rainfall for the Gemtree station is 356 mm per year with high evaporation rates of around 2,800mm. These factors have been important considerations for the landform designs during closure.

Table 3 - Alice Springs Meteorology Station (BOM Station ID 015590)

			Monthly Mean		
	Rainfall (mm)*	Monthly Evaporation (mm)	Daily Evaporation (mm)	Min Temp	Max Temp
May-12	0	162.2	5.6	4.5	23.3
Jun-12	0	118.4	3.9	2.1	19.9
Jul-12	0	129	4.2	-0.3	19.1
Aug-12	0	196	6.3	4.3	24.9
Sep-12	4.4	267	8.9	9.6	29.5
Oct-12	0.8	341.4	11	13.5	33.4
Nov-12	34.3	355.4	11.8	20.2	36.7
Dec-12	100.4	405.8	13.1	21.2	37.5
Jan-13	6.0	477.2	15.4	21.9	39.9
Feb-13	6.9	350.6	12.5	20.2	36.3
Mar-13	0	349.2	11.3	19	35.1
Apr-13	2.0	253.4	8.4	12.6	30.5

* Station ID 15653

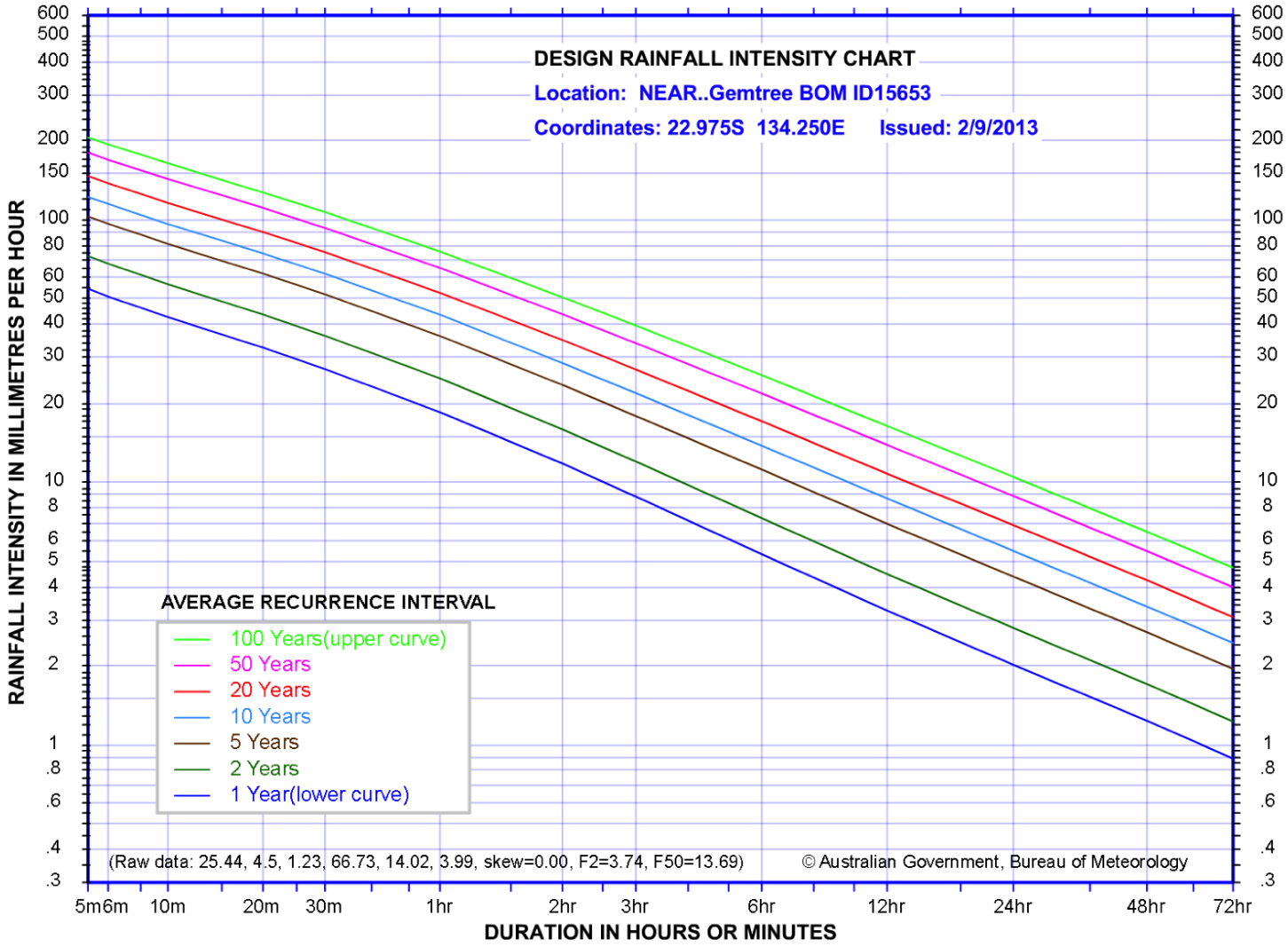

Figure 5 - Rainfall Intensity

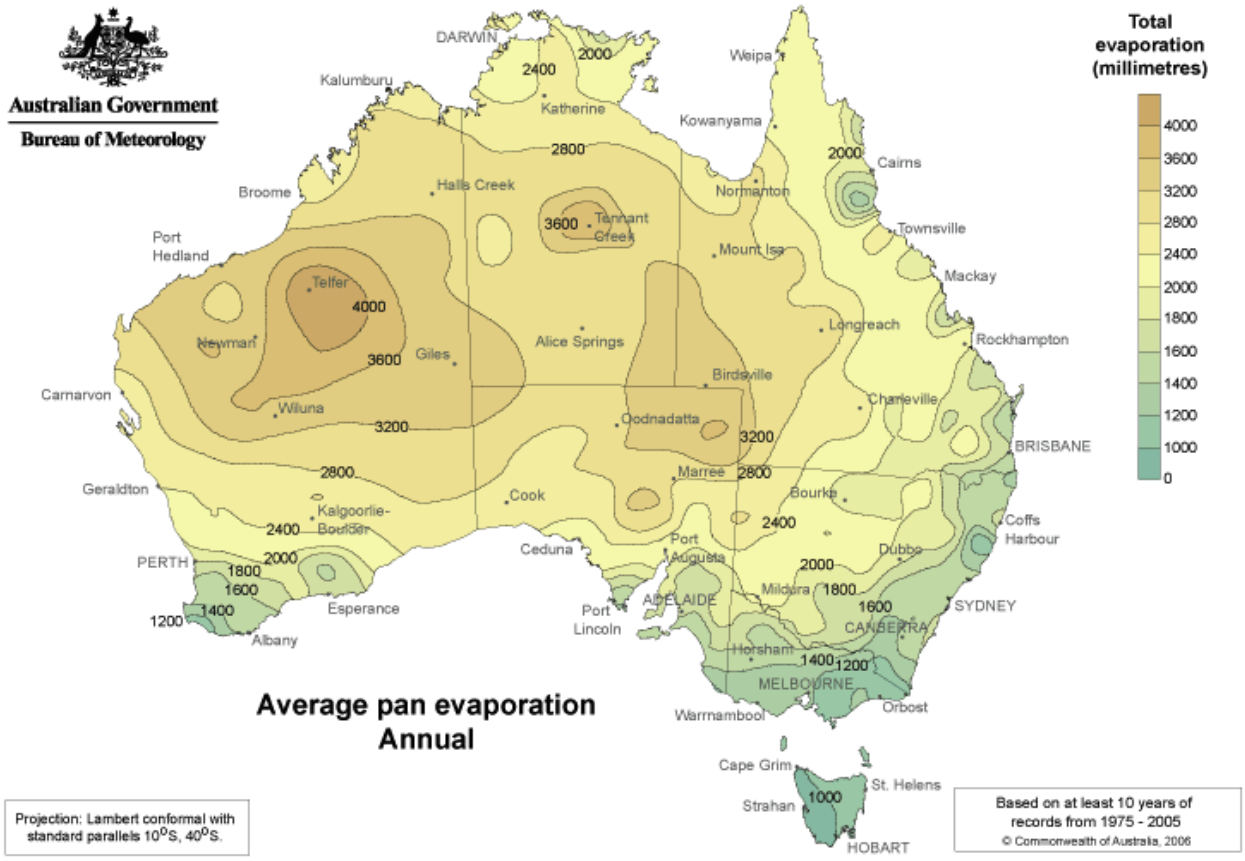

Figure 6 - Evaporation

4.1.5. HYDROGEOLOGY

There is no natural permanent supply of water within ML165. All creeks flow after heavy rainfall. Limited historic (pre-mining) groundwater information is available for the area. The information is limited to a single report title 'Mud Tank – Mining Water Supply' complied by E.Rooke 1995 Appendix 3.

Historic drilling had mixed success in the region and water strikes invariably yielded small supplies (<1 to 5l/s) of poor water quality (TDS values 2,500 to 9,700 mg/l)[4]. Of the several sites drilled and tested to supply potable water to the camp facility RN16676 was the only bore that proved adequate in quality and supply to meet the operational requirements.

RN 16676 was completed as a production bore and draws water from a thin, sandstone aquifer believed to be of Cainozoic age. Pumping infrastructure consists of a Mono B Mk.3 320 submersible pump (rate at maximum discharge of 0.6 l/s at 90mm total head) [5]. This bore will remain post closure as agreed to by the Department of Water, Alcoota station and AVI as summarised in the transfer of ownership letter attached as Appendix 1.

[4] E Rooke 1995 Mud Tank Mining Water Supply – Bore Completion Report
[5] E Rooke 1995 Mud Tank Mining Water Supply – Bore Completion Report

RN 16677 was drilled and cased at the same time RN 16676 was developed. The water quality of this bore was classified as saline and unsuitable for potable water use Although cased, it remained unequipped for the duration of the project. It has since been capped and the collar will be cut flush with ground level as part of the closure activities.

There have been no chemicals used in the processing of vermiculite ore at Mud Tank, therefore the contamination risk to the environment, including surface and groundwater, is minimal. Diesel fuel was used on site for power generation. One diesel generator powered the site, its associated fuel was stored within a bunded area and no spills were recorded for the duration of the project. Minimal hydrocarbon contaminated soil exists around the fuel bowser and have been excavated for bioremediation as discussed in section 10.

4.1.6. FLORA AND FAUNA

The project area, the broader fossicking reserve, the underlying and adjoining pastoral leases are all located in the Greater MacDonnell Ranges site of Conservation Significance[6]. The Great MacDonnell Ranges site of conservation significance bioregion expands some 31,326km^2. The Mud Tank project is situated on the north-eastern perimeter of the conservation zone near Hart Range as per Appendix 4.

Consltuants J.A. Kerle and J.N. Foulkes were commissioned to undertake a baseline flora and fauna survey of the area prior to the commencement of mining. The report is presented as Appendix 4.

The survey covered an area, much larger than the mining area itself and was divided into ten habitats on the basis of topography and surface characteristics. Two of these habitats covered the Zircon Hill area and a third comprised the flats containing the plant site and waste disposal area. J.A. Kerle and J.N. Foulkes 1993.

A relatively high plant species diversity (141 species) was observed with each habitat being floristically distinct, most were low shrubs, grasses and herbs with only a sparse distribution of larger shrubs and trees. A lower than average plant species diversity was observed on the Zircon Hill slopes than in most other habitat. J.A. Kerle and J.N. Foulkes 1993.

A bird population was present with 44 species being recorded. None were considered to be rate or endangered or in any way threatened. The Marsupial *Hopping Mouse* is uncommon and of a patchy distribution in central Australia overall and the report summarised that it was not believed to be threatened as a consequence of the mining operations. Its habitat was not recorded in the mining area although it was recorded in the waste disposal area. J.A. Kerle and J.N. Foulkes 1993. The conclusions of the study are reported below:

[6] NT Sites of Conservation Significance – Greater MacDonnell Ranges

- "The flora and fauna survey of the area has revealed no species of interest which would warrant any alterations to the mine:"

- A separate reptile study concluded that the area has a depauperate reptile fauna and of the species recorded there, or which may occur there, none are unusual or rare.

5. CLOSURE AND REHABILITATION STUDIES

5.1. PIT WATER QUALITY

The water quality in the pit lake (Pit A) was assessed in February 2013. Safe access to the pit lake is paramount, as such only three identified sites were classified as safely accessible sites, and samples were collected at these locations. Sample identification PA1, 2, 3 represents Pit A- sample sites 1 through to the 3 as depicted in the image below.

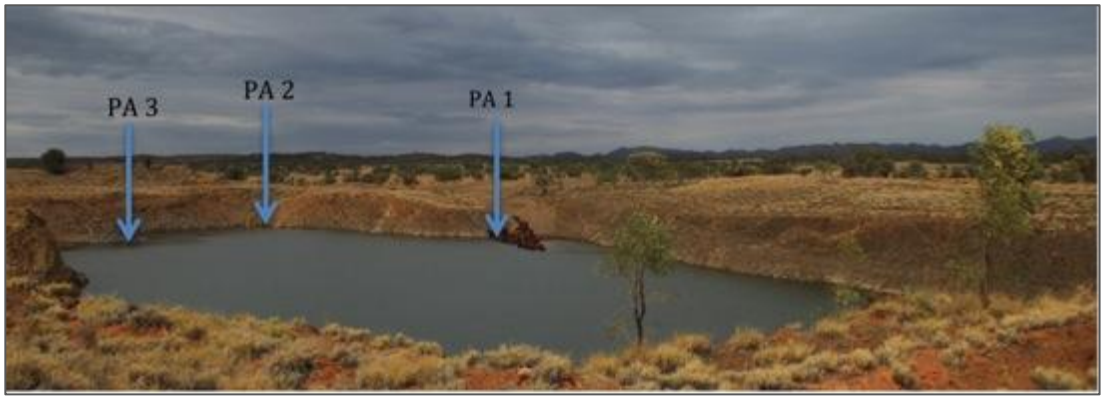

Figure 7 - Pit Water Quality Sampling locations February 2013

The samples were collected in accordance with the ANZECC water sampling guidelines and analysed by a NATA accredited laboratory in Darwin. The samples were collected to obtain an initial understanding of the water quality.

Water quality results for Pit A indicate that pH values are on the upper range of a neutral pH scale, with low level salt content (electrical conductivity) and low level metal concentrations. Aluminium was the only metal element that produced a result near or on the Australian Drinking Water Guidelines (ADWG). Aluminium occurs naturally in the environment and is a common element in weathered rock. The aluminium result is within the ANZECC stock water quality guidelines of 500ug/L. Sample results from Pit A are summarised in table and attached as Appendix 5.

The future use for the water in Pit A will likely be utilised by stock, birds and local fauna as a permanent water source. Over time as the natural landscape takes on the landform and with vegetation establishment it will become an important feature providing water for stock and possibly recreational purposes for the fossicking community. It is assumed that due to the shallow nature of the water body (approximately seven meters in depth) that stratification within the water profile does not exist. It is anticipated that the water quality of Pit A is indicative of expected water quality in Pit B.

Table 4 - Pit Water Quality Results

Site ID	ADWG - Trigger	PA1	PA2	PA3
pH	6.5-8.5	8.5	8.5	8.5
EC (uS/cm)	NA	247	244	246
TSS	NA	<10	<10	<10
TDS mg/L	600	130	140	130
Magnesium (Mg) mg/L	NA	6.2	6.2	6.2
SO4 mg/L	250-500	5.2	5.1	5.1
Aluminium (Al)ug/L	200	200	200	180
Copper (Cu)ug/L	1000	<10	<10	<10
Iron (Fe)ug/L	300	280	280	280
Arsenic (As)ug/l	10	<0.5	<0.5	<0.5

5.2. REVEGETATION METHODS

Revegetation methods during the course of the operation consisted of respreading topsoil and growth medium comprising of vermiculite waste across disturbed areas. In a few small areas on the mineral waste dumps and around Pit A tube stock planting has occurred both methods proved successful plant establishment.

The rehabilitation activities planned herein consist of spreading topsoil and growth medium where possible and where available. In areas such as the ROM, airstrip and generally larger parcels of disturbance, disturbed land will be directed seeded by broadcasting methods with locally sourced seed mix. Tube stock planting has not been included in the final rehabilitation works due to the presence of cattle and due to the fact that the tube stock mentioned above was successful as staff were available to care for the plants in the plant establishment phase.

Upon completion of revegetation works two sample sites will be selected. One on a sloping surface and one on flat ground, these will be fenced to excluded stock and fossickers. These two sample sites will be used to review the revegetation efforts without the impact or pressures applied by these activities.

The seed mix will included species that are preferably less desirable to cattle grazing and will consist of a mixture of small shrubs and trees were possible. Some native grass species may be utilised. The direct seeding rate of 1.5 kg/ha will be applied for the shrub species and 1 kg/ha for the grass species. The following is a list of species, which will be used during rehabilitation:

Table 5 – Seed Species

Species	Collected from	Distance to Mud Tank
Acacia kempeana	Yuendumu and Utopia	100-400km Range
Acacia victoria	Utopia and Ti Tree	100-210km Range
Acacia murrayana	Utopia	100-150km Range

Species	Collected from	Distance to Mud Tank
Senna artimisioides var artimisioides	Utopia	100-150km Range
Solanum central	Yuendumu	300-400km Range

5.3. WEED MANAGEMENT

Weed management will be carefully considered during the closure activities and all heavy equipment brought to site will be subjected to a weed inspection prior to the commencement of works. If machinery arrives with soil and possible weed contamination from another site it will be cleaned off site prior to use in Mud Tank rehabilitation works and documented.

Any established weeds such as Ruby Dock will continue to be sprayed and hand pulled while closure activities progress. Weed management will continue on the site post closure in conjunction with site visits for water sampling and visual monitoring. Weed management will continue until a certificate of closure is issued for Mud Tank.

5.4. HYDROCARBON SOIL REMEDIATION

No hydrocarbon spills have been recorded for the operation. There is a very low risk of groundwater being affected as a result of hydrocarbon contamination. It cannot be guaranteed that for the life of the operation that the fuel bowser, fuel storage drums and associated fuel storage infrastructure contained within the designated fuel bund have not leaked from time to time. Therefore using a conservative approach the top layer of soil will be removed from the diesel storage area and will undergo bioremediation.

Soil that is contaminated by hydrocarbons will be remediated in-situ utilising the bioremediation agent Enretech as per appendix 7. Soils that have been identified, as having hydrocarbon contamination will be removed, stockpiled, treated with Enretech, tilled and watered accordingly. Analysis of the soil will be undertaken before and after treatment to ensure effective remediation has occurred. The soil will be remediated to a level suitable for agricultural land use as per the table below and as outlined in Appendix 10.

Table 6 - Hydrocarbon Remediation Level

Land Use	Soil Texture	Fraction 1	Fraction 2	Fraction 3	Fraction 4
Agricultural	Coarse-grained soil	130	450 (150[a])	400	2800
	Fine-grained soil	260 (180[b])	900 (250[b])	800	5600
Residential/Parkland	Coarse-grained soil	30[c]	150[c]	400	2800
	Fine-grained soil	260 (180[b])	900 (250[b])	800	5600
Commercial	Coarse-grained soil	310 (230[a])	760 (150[a])	1700	3300
	Fine-grained soil	660 (180[b])	1500 (250[b])	2500	6600
Industrial	Coarse-grained soil	310 (230 [a])	760 (150 [a])	1700	3300
	Fine-grained soil	660 (180 [b])	1500 (250 [b])	2500	6600

* Additional Tier 1 levels are presented in the next four tables.
a = Where applicable, for protection against contaminated groundwater discharge to an adjacent surface water body.
b = Where applicable, for protection of potable groundwater.
c = Assumes contamination near residence with slab-on-grade construction.

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5.5. CLOSURE CONCERN - DUST MANAGEMENT

Dust management will be a key consideration during closure earthworks. Although not directly impacting any nearby communities dust generated from the Mud Tank site might be a potential nuisance for visiting fossickers and tourists. In this situation no potentially hazardous metals or contaminates of concern are known which might have associated health impacts. If a health risk is identified AVI will address the risk utilising the Imerys safety management system and implement contingencies to manage the associated risk. For example watering down areas as required.

Dust management practices similar to those utilised during operations will include monitoring wind direction and planned activity to ensure minimal impact as a result of closure works.

In the event a complaint is made AVI will work proactively to resolve the issue and will maintain a complaints register for the departments records. AVI will take reasonable measure to ensure that ground cover can establish as soon as possible thereby reducing the potential risk of dust generation long term.

5.6. CLOSURE CONCERN – EROSION

Erosion caused by either wind or water could potentially deteriorate the stability of the final landforms. Methods to mitigate erosion have been incorporated into design for example creating a concave landform on the mineral waste dumps to prevent gully erosion caused by excessive rainfall. The site will be ripped along contour and sympathetic to the natural environment to reduce the potential of erosion. Drainage lines will be re-established were disturbed to ensure free flowing water surfaces post closure.

[7] Guidelines for the sitting, design and management of solid waste disposal sites in the Northern Territory

6. STAKEHOLDER CONSULTATION

The aim of stakeholder consultation is to ensure that individuals and groups are identified and suitably engaged. In addition, it assists in the development of an MCP to address concerns and issues, provide feedback and ultimately meet closure objectives relating to minimising the potential impact of closure on stakeholders.

6.1. STAKEHOLDER IDENTIFICATION

Stakeholders are defined as individuals, government agencies, community groups or others who hold a vested interest in the operation, or those who may be affected by the mining activities, products or services. Table 5 provides a list of the stakeholders and engagement strategies and frequencies.

6.2. STAKEHOLDER COMMUNICATIONS STRATEGY

Stakeholder consultation will continue to be ongoing throughout the duration of the mine closure activities. It has been expressed by stakeholders throughout the life of the project that at closure the land be rehabilitated for fossicking and grazing purposes. This is consistent with AVI's objective of creating post closure landforms that are safe, stable and non-polluting.

AVI will take every reasonable measure to construct safe and stable landforms however the impact sustained on these landforms from fossicking and grazing activities post tenement relinquishment is outside of AVI's reasonable rehem of control. Unrestrained fossicking and grazing activities will likely have a detrimental impact on closure efforts.

6.3. STAKEHOLDER CONSULTATION

Intensive stakeholder consultation for the closure activities commenced in February 2013. Key company representatives, Mud Tank staff and Ensolve consultants formally engaged key stakeholders in the closure activities for the project. Methods of consultation included formal meetings, informal discussions, site visits, formal correspondence and two-way communication on closure expectations.

Key personnel engaged include:

- Mr Mike Fowcett (Acting Director Department of Mines and Energy) April 2013, site visit May 2013, present - ongoing
- Ms Amanda Jobson (Department of Mines and Energy) February – Present and ongoing 2013
- Ms Grace Thorpe (NT Land Corporation) April– June 2013
- Terri Zyka (Minerals Titles Division Department of Mines and Energy) March 2013

- Alcoota Station Manager – Chris Nott June 2013 and ongoing
- Gem Fossicking Community – Aaron Gemtree Caravan Park Owner
- Gem Fossicking Community – Fossickers on the field February – Present and ongoing
- Martin Glass – MCA MoU Representatives May 2013
- Ross Engineering – February – Present and ongoing

Table 7 – Level and detail of stakeholder consultation

Stakeholder	Key Concerns	Consultation Methods	Consultation to Date
Territory Government: • DME • EPA • DoW • DoH	• Regulate relevant Territory or Commonwealth legislation • Environmental impacts • Impacts to fossicking reserve • Impacts to pastoral activities • Impacts to indigenous communities	• Submission of EWP • Submission of MCP • Site inspections • Closure specific consultation - formal correspondence/ meetings and meetings • Ongoing liaison	• 28th February 2013 meeting with DME to discuss closure expectations • 5th March formal letter to DME • 1st May site inspection with DME personal and Director • 1st March Formal letter to DME addressing concerns from the 2011 draft MCP • June 2013 consultation regarding transfer of bore ownership to Alcoota station
Non-Government Organisations: • Gemtree fossicking group • Gem Fossicking community	• Environmental impacts • Visual amenity	• Closure specific consultation – formal correspondence/ meetings • Invitation for site visit	• June 2013 Meeting at Gemtree caravan park with management • June 2013 Gem tree Site visit • Ongoing In field discussions with fossickers
• Employees • Shareholders	• Provision of employment opportunities and redundancies • Future investment opportunities	• Availability of MCP • Website • Meetings • Investor/Customer briefings industry	• Ongoing one on one consultation with employees from management • May 2013 Presentation of MCP in Shanghai to Imerys Management Group • May 2013 Progress report • April 2013 EWP

Stakeholder	Key Concerns	Consultation Methods	Consultation to Date
Indigenous Groups: • NT Land Corporation • Alcoota Station • Local indigenous people through the Minerals Council of Australia (MCA) and Federal Government Memorandum of Understanding (MoU) • Rod Honer (Local seed collection group manager)	• Minimise impacts on the environment and opportunities for local indigenous communities • Opportunity for involvement during closure activities • End land use	• Closure specific consultation – formal correspondence/ meetings • Invitation for site visit • Engagement for native seed collection and seed broadcasting	• April 2013 Phone conversations with NT Land Corporation • April 2013 Formal written correspondence relating to closure of mud tank • June 2013 formal written correspondence updating on closure activities • May 2013 meeting with Martin Glass MCA – MoU representative to discuss opportunities I. CAT Course and Imerys offer to provide qualified engineer to support learning II. Revegetation/seed collection III. Monitoring opportunities post closure • June 2013 meeting with Rod Honer to discuss seed availably and quality
Local Pastoralists: • Alcoota Station	• Maintain pastoral conditions and local infrastructure	• Closure specific consultation – formal correspondence/ meetings • Invitation for site visit	• June 2013 site visit • June 2013 letter regarding transfer of bore ownership to Alcoota station
Customers, local business, goods and services providers and contractors	• Change of economic opportunities	• Closure specific consultation – formal correspondence/ meetings	• Commencing Q2 2011 customers were advised regarding Mud Tank Closure • April 2013 Early Works Plan – Ross Engineering engaged to complete project

7. IDENTIFICATION AND MANAGEMENT OF CLOSURE ISSUES

The potential risks associated with closure and decommissioning are discussed in this section. It should be noted that this high-level risk assessment only addresses the broad risks associated with post closure landforms and where applicable identifies risks to the public during closure activities such as accessing the site during the decommissioning works.

A detailed risk assessment will be completed for each aspect of the closure activities prior to the commencement of tasks. All safety risk assessments and associated safety management system documentation will be completed by the contractor and signed off and supervised by an AVI representative as per the Imerys Safety Management System. Copies of safety related documentation will be provided upon request.

7.1. HIGH LEVEL RISK ASSESSMENT

This risk assessment aims to assess the risks and identify management practices to mitigate potential impacts resulting from mine closure.

The objectives for the risk assessment were specifically to:

- Identify the key hazards and risks for the remaining landforms
- Consider the risk to public safety associated with the remaining landforms
- Evaluate the risks and identify management measurers to mitigate the risks

The risk management measures to be implemented aim to significantly reduce the likelihood and consequence of hazards and ultimately seek to eliminate any potentially 'extreme' or 'high' classified risks to people, property and the environment. The following safety risk matrix was used.

		Consequence				
		Catastrophic (5) *Fatality; Permanent incapacity, disability or chronic illness*	**Major (4)** *Serious irreversible disability, impairment or illness*	**Moderate (3)** *Moderate irreversible disability or impairment*	**Minor (2)** *Reversible health impact*	**Negligible (1)** *No injury, incapacity or disability*
Frequency	**Near Certain (5)** *Is expected to occur - a common event. Expected frequency greater than once a Year.*	**Extreme 10**	**Extreme 9**	**Extreme 8**	**High 7**	**High 6**
	Likely (4) *The event is likely or expected to occur. Expected frequency once per 1 to 5 years.*	**Extreme 9**	**Extreme 8**	**High 7**	**High 6**	**Moderate 5**
	Possible (3) *The event will possibly occur. Expected frequency once per 5 to 25 years.*	**Extreme 8**	**High 7**	**High 6**	**Moderate 5**	**Low 4**
	Unlikely (2) *The event could occur at some time. Expected frequency once per 25 to 100 Years.*	**High 7**	**High 6**	**Moderate 5**	**Low 4**	**Low 3**
	Rare (1) *The event may occur in exceptional Circumstances. Expected frequency >100 Years.*	**High 6**	**Moderate 5**	**Low 4**	**Low 3**	**Low 2**

7.2. HIGH LEVEL IDENTIFIED RISKS

Description	Risk	Realistic Impact	Cons	Freq	Risk Rank	Safety Control	Cons	Freq	Risk Rank
Pit A	Fall	Injury to person; break; drowning, fatality	5	3	8	Signage to alert persons of edge; removal of road around perimeter; provide safe pedestrian access point to water in order to deter unsafe access	5	2	7
Pit B	Fall	Injury to person; break; fatality	5	3	8	Reduce pit wall edge to a safe slope; fill material in pit to reduce fall height; signage to alert persons of danger	5	2	7
Site	Unauthorised access to the mine site and dangerous landforms such as open pit walls during earthworks	Injury to person; break; fatality	5	3	8	Barricades and warning signage to be erected during works to prevent access Supervision of job site	3	2	5

Description	Risk	Realistic Impact	Cons	Freq	Risk Rank	Safety Control	Cons	Freq	Risk Rank
Pit B	Pit wall failure	Injury to person;	5	4	9	Reduce batter angle of walls; warning signage	5	3	8

As mentioned above this is not a full and comprehensive risk assessment addressing all risks associated with closure activities. The detailed risk assessments will be completed for each aspect of the closure activities prior to the commencement of tasks. All risk assessment, JSAs and associated safety management system documentation will be completed by the contractor and signed off and supervised by an Imerys or AVI representative (Maxime Descot) as per the Imerys Safety Management System.

Copies of safety related documentation will be provided upon request.

8. POST MINING LAND USE AND CLOSURE OBJECTIVES

8.1. BOND RETURN AND TENEMENT RELINQUISHMENT

Bonds held for the Mud Tank project are held under two Acts. A bond of $17,000 is held under the Mining Management Act 2002 held as a cash bond. A bond of $15,000 is held under the Mining Act 1996 as a bank guarantee. AVI is working towards full tenement relinquishment by 2016.

8.2. LAND USE

Upon closure of the mine, the land will be returned to the fossicking reserve NT land portion 3790 and will primarily be used for gemstone fossicking accessible to by the public. Cattle grazing will likely continue post closure.

8.3. COMPLETION CRITERIA

Completion criteria are needed to confirm that the overall objectives of rehabilitation have been met prior to the relinquishment of any part of the rehabilitation bond.

The aim of closure is to ensure that the site is left in a condition which reflects government and community expectations. Completion criteria have been based on a set of generic criteria issued by the DME as guidelines for the mining industry in the Northern Territory.

The completion criteria based on the ANZMEC Guidelines for mine closure reflect the closure objectives and can be summarised as being:

- Specific enough to reflect the unique set of environmental, social and economic circumstances relevant to the mine being closed
- Flexible enough to adapt to changing circumstances without compromising objectives
- Include environmental indicators suitable for demonstrating that rehabilitation trends are heading in the right direction
- Have an agreed process for the periodic review and modification of completion criteria in light of improved knowledge or changed circumstance
- Developed in consultation with stakeholders

Progressive assessment against closure criteria demonstrates the relative success of rehabilitation in achieving the allocated closure objectives and outcomes. Closure criteria aim to be:

- Clear and as simple as possible
- Aligned with legal obligations and commitments
- Aligned with the allocated closure objectives

- Assessed at various stages of mine completion

Refined criteria have been established through stakeholder consultation. The completion criteria and measures for monitoring and attainment are provided in table 7 and 8.

Table 8 - Mud Tank Closure Objectives

Item	Objective	Activities/modelling/management used to predict and minimise impacts
Public Safety	Dispose of all waste and materials from operational areas upon decommissioning Limit access as far as reasonably possible	Reduce falling risk around Pit B by reducing slope and edge walls of pit B as far is safely practicable Install warning signs around perimeter of Pit A Remove vehicle access around Pit A Remove all infrastructure from site Waste generated, as part of closure will be disposed of in Pit B as per DME approval Early works plan. Material will be covered by a 2-meter thick cover consisting of surrounding soils from the edges of Pit B. Material disposed of in Pit B will be compacted using heavy vehicle compaction e.g. dozer tracking GPS records of the exact disposal location will be provided upon placement of materials and will be recorded for DME records. No reactive or toxic waste will be disposed of in Pit B. Excess tyres will be disposed of in Pit B
Physical Stability	Attain physically stable final landforms with conditions suitable for the natural establishment of a self-sustaining vegetation community	Designs based on region specific climate data Designs based on available material Construction and rehabilitation activities supervised by qualified engineer Pit B waste backfilling will be completed in accordance with NT landfill guidelines
Ecosystem	Re-establish self-sustaining vegetation communities on disturbed areas.	Establish representative photo monitoring sites.
Final Land Use	Rehabilitate disturbed areas to a state that is safe and stable	Consultation with pastoralists to manage grazing stock movements around newly rehabilitated areas Consultation with Gem Fossicking Community to educate them of newly rehabilitated areas Signage advising of rehabilitated areas Use of non-palatable species where possible
Visual Amenity	Establish final landforms that where practicable, integrate with the natural surroundings.	Reshape and contour landforms Utilise appropriate growth medium (topsoil/subsoil) to encourage vegetation growth

Table 9 - Mud Tank Completion Criteria

Completion Criteria	Measurement Tool	Timeframe
Miscellaneous Surface Infrastructure (roads, water bore), Airstrip, Camp Area		
• Rehabilitated areas will be free of any man made items which pose a risk to public safety • All excavations backfilled • Sewage facility safely decommissioned • Access roads rehabilitated as per the MCP	• Audit of compliance against the mine closure plan following decommissioning to ensure all materials are removed or those that remain have approval obtained from the end land owner • Sewage facilities safely decommissioned and photographic evidence provided of works during and upon completion • Audit shows all road infrastructure no longer required is decommissioned	Complete: Nov 2013
• The water bore will remain post closure • Telstra equipment as per the MCP camp domain will remain post closure	• Record of acceptance from NT Land Corporation and photographic records of bore condition when handover to Alcoota and NT Land Corporation. • Audit against approval from NT Land Corp to ensure only approved infrastructure remains	Complete: Nov 2013
Process Plant and Infrastructure, Product Handling Area, ROM		
• Rehabilitated areas will be free of any man made items which pose a risk to public safety • All buildings and site infrastructure removed • All excavations backfilled • Process plant cement floor is free from any metal protrusions	• Audit of compliance against the mine closure plan following decommissioning to ensure all materials are removed • Audit of cement floor to ensure no metal protrusions remain post closure, photographic evidence provided	Complete: Nov 2013
• Hydrocarbon contaminated soils remediated to industrial standards	• Soil sampling and validation of remediation through an analysis program to demonstrate the soil meets the industrial standard of the NT environmental guideline for contaminated site remediation	Complete: Nov 2013 Nov 2014
Mineral Waste Dumps, Overburden Stockpiles		
• Mineral waste dumps have a concave surface as per the MCP • Mineral waste dumps and stockpiles are trending towards landform stability	• Monitoring of waste dumps shows that structures remain safe and stable over 2 consecutive years • Visual monitoring indicates rill and gully erosion on rehabilitated areas is not active and has stabilised over 2 years • Audit of final earthworks against the MCP	Complete: Nov 2013 Nov 2014 Nov 2015

Completion Criteria	Measurement Tool	Timeframe
	• Annual visual observations for vegetation establishment including basic quadrant survey and specie diversity	
Open Pits		
• Pit A will not be backfilled, warning signs will be installed notifying the risk • Water in Pit A remains stable and does not impact the fauna using the water source • No injuries or deaths resulting from pit stability or access to pit	• Audit of warning signs shows signs were installed as per the MCP • Monitoring post closure (3 years) demonstrates that pit water is of suitable quality. No visible evidence of fauna deaths surrounding Pit A • Visual observations for erosion, cracking or instability conducted annually • Visual monitoring indicates rill and gully erosion on rehabilitated areas is not active and has stabilised over 2 years • Annual audit of warning signs shows signage is in adequate condition • Road around Pit A removed to prevent access and photo evidence provided	Complete: Nov 2013 Nov 2014 Nov 2015 Nov 2016
• No toxic or reactive waste disposed of in Pit B • The material backfilled into Pit B will have a 2 meter thick cover and will be compacted using track rolling methods • Pit B trending towards landform stability	• Visual observations and photography of waste disposed in Pit B during waste disposal • Physical measure of cover thickness over material disposed of in Pit B, evidence of track rolling provided by photographic monitoring • Monitoring of Pit B shows that structures remain safe and stable over 3 consecutive years	Nov 2013 2013,2014,2015
Landfill		
• No reactive or toxic waste disposed in landfill • Landfill cover will be at least 2 meters thick and compacted using track rolling methods	• Audit of waste during back filling to ensure no reactive or toxic waste is disposed of in landfill • Physical measure of cover thickness over landfill, evidence of track rolling provided by photographic monitoring	Complete: Nov 2013
Ecosystem Stability		
• The landscape is trending towards a stable self sustaining landscape comparable to the surrounding area • Visual/photographic monitoring results show plant establishment	• Annual visual observations including basic quadrant survey and species diversity and photography • Visual observations for erosion, cracking or instability conducted annually • Visual monitoring indicates rill and gully erosion on rehabilitated areas is not active and has stabilised over 2 years	Nov 2013 Nov 2014 Nov 2015

Completion Criteria	Measurement Tool	Timeframe
Final Land use		
• Visual Monitoring indicates post-mining land uses are not impacting the physical stability and vegetation establishment of rehabilitated areas	• Visual observations and photography	Nov 2013 Nov 2014 Nov 2015
Visual Amenity		
• Inspections indicate vegetation and rehabilitated landforms blend into the surrounding landscape	• Photographic monitoring	Nov 2013 Nov 2014 Nov 2015

9. MINE CLOSURE IMPLEMENTATION PLAN

9.1. GUIDANCE MATERIAL

The proposed rehabilitation and decommissioning strategy has been developed based on the following:

- Guidelines for Preparing Mine Closure Plans (Western Australia Department of Mines and Petroleum 2011)
- Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure and Completion (Department of Resources, Energy and Tourism 2006)
- Leading Practice Sustainable Development Program for the Mining Industry - Mine Rehabilitation (Department of Resources, Energy and Tourism, 2006)
- Leading Practice Sustainable Development Program for the Mining Industry - Landform Design for Rehabilitation (Environment Australia, 1998)

9.2. DOMAIN 1 - MISCELLANEOUS SURFACE INFRASTRUCTURE (ROADS, TRACKS, WATER BORES AND ASSOCIATED PIPELINES)

A number of roads have been previously established by the fossicking community prior to the commencement of mining in 1995. The roads that have been identified as pre-existing fossickers roads and tracks will remain post closure, refer to figure 8 below. Haul roads and primary mining roads will be rehabilitated by contour ripping and seeding. Roads to be rehabilitated are depicted in figure 8.

Production bore RN16676 will remain in a functional capacity and transfer of ownership to NT Land Corporation will occur at closure as per Appendix 1.

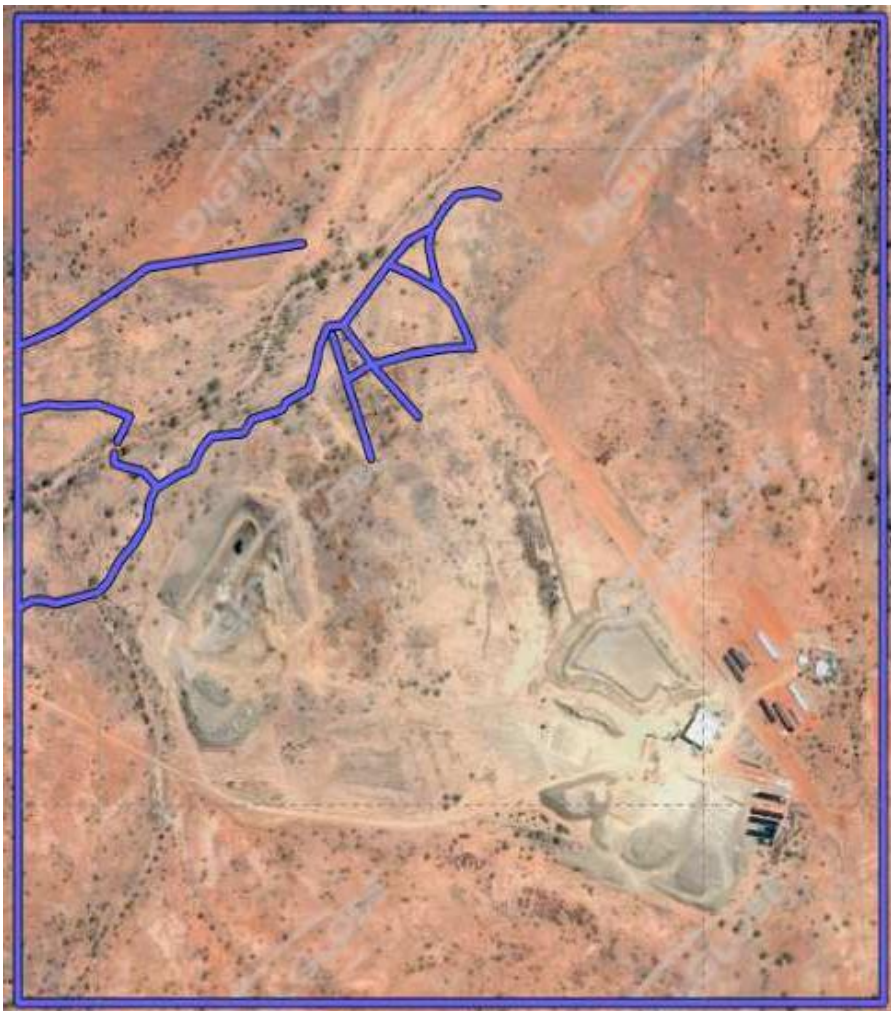

Figure 8 - Fossicking tracks, which will remain post closure

Figure 9 - Roads to be rehabilitated

One production bore was installed to provide potable water for the camp facilities RN16676, ownership and all associated responsibilities will be transferred to NT Land Corporation and Alcoota station as per signed agreement letter Appendix 1.

Table 10 - Domain 1 Closure Tasks

Infrastructure	Closure Task/Activity
Roads and tracks	• Remove signage from all disused roads and tracks • Reshape to provide free draining surfaces • Reinstate drainage lines • Deep rip surfaces • Soil amelioration and seeding
Bore field and pipeline infrastructure	• Disconnect camp bore line • Transfer ownership to Alcoota Station

9.3. DOMAIN 2 - PROCESSING PLANT

The processing plant domain comprises of plant infrastructure, small water tanks, office hut, shed and cement flooring. The sites power generator and its associated fuel storage tank is also located within this domain.

Figure 10 - Processing Plant Feb 2013

Table 11 - Domain 2 Closure Tasks

Infrastructure	Closure Task/Activity
Processing Plant	• Disconnect and terminate services • Disassemble and remove all infrastructure • Disassemble and remove all pipelines and associated pumping infrastructure • Remove signage, and other miscellaneous items • Disassemble and remove industrial buildings • Deconstruct and remove large tanks • Concrete pads, structures and footings to remain • Cut all remaining metal flush with final surface level • Reshape area to form a free draining surface and deep rip along the contour • Broadcast seeding

Infrastructure	Closure Task/Activity
Fuel Storage	• Disconnect and terminate services • Disassemble and remove all infrastructure • Disassemble and remove all pipelines and associated pumping infrastructure • Copper pipe to be removed • Remove all signage, lights and other miscellaneous items • Decommission and remove tank including all pipes and bunding (tank to be returned to supplier) • Bioremediation of contaminated materials as per appendix 7 • Remove waste oil drums in accordance with NT Contaminated Site guidelines 2003 • Reshape to form a free draining surface and deep rip along the contour • Broadcast seeding
Diesel Generator	• Disconnect and terminate services • Disassemble and remove all pipelines and associated infrastructure • Disassemble and remove all power infrastructure • Remove all signage and other miscellaneous items • Reshape to form a free draining surface and deep rip along the contour • Broadcast seeding
Process offices	• Disconnect and terminate services • Disassemble and remove communications infrastructure • Disassemble and remove industrial and small buildings, as well as associated infrastructure • Bury concrete pads, structures and footings • Collapse septic tanks • Reshape to form free draining surfaces and deep rip along the contour • Broadcast seeding

9.4. DOMAIN 3 - FINAL PRODUCT HANDLING AREA

This domain covers the final product handling area an area used to store product prior to sale. Also included within this domain is the site's laydown area, this area has been used for scrap materials and items which could be recycled throughout the mine life.

Figure 11 - Product Handling Feb 2013

Figure 12 - Laydown Yard 2013

Table 12 - Domain 3 Closure Tasks

Infrastructure	Closure Task/Activity
Final Product Handling Area	• Remove all ore stocks from site or dispose of into Pit B • Remove all signage and other miscellaneous items • Reshape to form free draining surfaces • Deep rip all surfaces along the contour • Broadcast seeding
Laydown Yard	• Remove all materials from laydown area • Reshape to form free draining surfaces • Deep rip all surfaces along the contour • Broadcast seeding

9.5. DOMAIN 4 - RUN OF MINE PAD (ROM)

The Run of Mine Pan (ROM) is a flat area that was used to stockpile and dry ore prior to processing. Included in this domain is the loading ramp used to feed the processing plant.

Figure 13 - ROM Feb 2013

Table 13 - Domain 4 Closure Tasks

Infrastructure	Closure Task/Activity
ROM pad	• Remove all signage and other miscellaneous items • Disassemble and remove ROM ramp including the steel • Respread remaining materials • Reshape to form free draining surfaces • Deep rip all surfaces along the contour utilising surveyed contours • Broadcast seeding

9.6. DOMAIN 5 - MINERAL WASTE DUMPS

The inert mineral waste dumps will be concave in nature on the surface designed to temporarily hold water from incidental rainfall. The design and construction details are discussed below.

Figure 14 - Mineral Waste Dump Old

Figure 15 - Mineral Waste Dump New

Design of Mineral Waste Dump (MWD) [8]

- The existing berm will be pushed to the outer edge of the old MWD to remove the berm
    - The removal of the berm is intended to ensure dump stability by preventing erosion which may occur across the berm

- The top of both inert MWDs will have a concave surface [9] constructed to:
    - Temporally hold incidental rainfall
    - Hold a 1:100 year rainfall event

[8] Department of Mines 2013 letter to AVI

[9] Environment Australia 1998 Best practice Environmental Management in Mining - Landform design for rehabilitation

    - Allow infiltration of rainfall through the MWD profile
    - Promote evaporation
- The upper surface of the MWDs will become a temporary water holding basin which will result in the following:
    - Potential impacts to vegetation growth and establishment
    - Permanency of vegetation on the surface of the MWD
    - Limited access for humans and stock

Construction Considerations [10],[11]:

- The edge wall around the MWD will not be designed to retain water or hold water against its surface
- The edge wall will be constructed with large vermiculite particles sourced from the existing MWD
- The temporary water holding basin will be constructed utilising a dozer and loader if required
- Compaction will be limited to traffic compaction from the dozer and loader during construction
- The surface will gently slope towards the centre of the MWD to form a concave landscape
- Spillways will not be constructed on the waste dumps, unless requested by the DME.
- The calculated volume for the basin is approximately:
    - MWD Old 2867 m^3
    - MWD New 4979 m^3
    - To generate the basin volume the catchment area is multiplied by the depth of rainfall (1:100 72 hour rainfall event of 341.28mm) to give the total volume of water.
    - Evaporation has not been factored into these calculations to maintain a conservative approach.
    - These calculations are based on catchment areas of 8400m^2 (Old) 14590m^2 (New) with rainfall event of 341.28mm as per figure 4 statistics from BOM.
    - The above information is based on current available data; its accuracy is dependent on external sources. Therefore the catchment areas are approximate volumes based on these data.
- The area will be surveyed to ensure appropriate holding capacity upon completion
- The height of the MWD will remain at the existing height of approx. 10m
- The angle and slope of the MWD will remain in its present form between 20-30^o

[10] Department of Mines 2013 letter to AVI

[11] Environment Australia 1998 Best practice Environmental Management in Mining - Landform design for rehabilitation

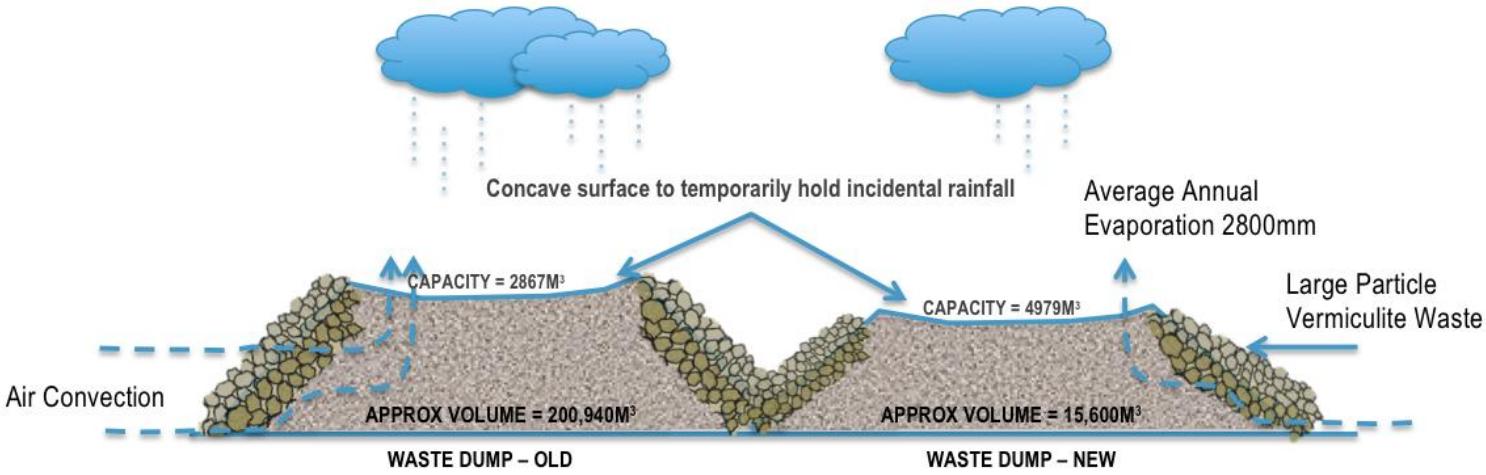

Figure 16 - Mineral Waste Dump Design

Figure 17 - Mineral Waste Dump Old and New

Table 14 - Domain 5 Closure Tasks

Infrastructure	Closure Task/Activity
Mineral Waste Dump (Old)	• Primary earthworks to push down batters and construct crest bund • Create concave surface • Primary earthworks to profile landform • Broadcast seeding
Mineral Waste Dump (New)	• Primary earthworks to construct crest bund and concave surface • Contour earthworks/deep rip along the contour • Broadcast seeding

9.7. DOMAIN 6: PIT A (PIT LAKE)

Pit A was constructed approximately half a kilometre from the processing plant. It was approved by under the Northern Territory Mining Act in 1995 designed and constructed by Blue Circle Southern Cement in 1996 to an approximate depth of approx. 30m with a total extracted volume of approx. 170,000 m3. Pit A ceased extraction in 2003.

The vermiculite and overburden were generally amendable to free digging therefore the use of explosives throughout the mine life were not required.

The ore was extracted through mining campaigns and generally involved the following tasks:

- The removal and stockpiling of top soil for future use in rehabilitation
- The removal, transport and placement of zircon bearing overburden
- The removal, transport and disposal of other mine waste
- The extraction of vermiculite and its transport to the processing plant

Contract bulldozers, loaders and trucks were utilised during the start up and bulk mining phases.

Pit A will remain a pit lake in perpetuity with one access point established for safe animal access. No vehicle accesses will be permitted around Pit A post closure, to prevent access the existing road around Pit A will be removed making it inaccessible to vehicles. No bund, berm or fence will be installed around Pit A.

Warning signs alerting public of the pit edge and associated danger will be erected at 50 meter intervals around the perimeter of Pit A these signs will be separated by a distance no greater than 50m therefore means an individual can not be more than 25m away from a clearly marked warning sign at any point [12]. Signs will be mounted on a frame made of 25mm steel with 50mm post. The main danger sign will be on a 3mm black steel sheet with a plasma cut profile (similar to a stencil). A 2mm stainless steel backing will go behind the sign so the letters can be read clearly without any requirement for painting. Signs will be 900mm x 600mm 14 will be ordered in total at a distance of 50 m apart.

The water in pit A consists of rainwater and presumably some groundwater inflows. Water quality within the pit has been tested against the Australian Drinking Water Guidelines and results are discussed in section 6.1.

[12] Department of Mine 2013 letter advice to AVI and email 14/5/2013

Table 15 - Domain 6 Closure Tasks

Infrastructure	Closure Task/Activity
Pit A	• Remove road access around perimeter of pit • Install signage 50 m intervals • Finalise earthworks at water access point to make the access point safe and stable

Figure 18 - Pit A road to be removed

Figure 19 - Pit A Water Access Point

9.8. DOMAIN 7: PIT B

Pit B is located approximately 230m north-east of Pit A. The intent to mine Pit B was identified in the approved Preliminary Environmental Report (PER) that was used as the assessing document to grant MLS 165. Pit B was mined in 2010 to an approximate depth of approx. 20m deep with a total extracted volume of 38,000 m3.

The vermiculite and overburden were generally amendable to free digging therefore the use of explosives throughout the mine life were not required.

The ore was extracted through mining campaigns and generally involved the following tasks:

- The removal and stockpiling of top soil for future use in rehabilitation
- The removal, transport and placement of zircon bearing overburden
- The removal, transport and disposal of other mine waste
- The extraction of vermiculite and its transport to the processing plant

Contract bulldozers, loaders and trucks were utilised during the start up and bulk mining phases.

During the May 2013 site visit with the DME it was established that the most effective way to reduce the long-term risks associated with B would be to:

A. The pit walls of Pit B be battered back to create a safe slope which is expected to meet a waters edge within Pit B. If deemed necessary water from a nearby creek will be diverted into Pit B to generate a shallow pit lake environment.

B. Inert clean waste [13] generated from the site rehabilitation activities will be disposed of in Pit B, no reactive or toxic waste will be placed in Pit B. Tyres will be disposed of in Pit B, the number disposed of will be recorded as part of closure data to be submitted to DME upon completion of closure activities.

A. A cover approximately 2 meters thick will be placed over the waste disposed of in Pit B. The cover will comprise of soil surrounding the pit that will be pushed in to create the gentle slopes. If deemed necessary water from the diverted creek will rest on top of the cover system as depicted and described and detailed below. [14]

The pit walls of Pit B will be battered back to create a safe slope, which meets an expected waters edge within Pit B. The angle for the pit walls will be as far as safely practical in order to create a gentle slope with the use of a bulldozer. This final angle will be recorded in the sites

[13] Guidelines for the sitting, design and management of solid waste disposal sites in the Northern Territory

[14] Guidelines for the sitting, design and management of solid waste disposal sites in the Northern Territory

final survey pick up and reported to the DME upon completion. If deemed necessary water from a nearby creek will be diverted into Pit B to generate a shallow pit lake environment.

Clean waste generated from the site rehabilitation activities will be disposed of in Pit B, no reactive or toxic waste will be placed in Pit B. Tyres will be disposed of in Pit B, the number disposed of will be recorded as part of closure data to be submitted to DME upon completion of closure activities. [15]

A cover approximately 2 meters thick will be placed over the waste disposed of in Pit B. The cover will comprise of soil surroundings the pit that will be pushed in to create the gentle slopes. If deemed necessary water from the diverted creek will rest on top of the cover system as depicted the in figure below.

[15] Department of Mines and Energy Letter 2013

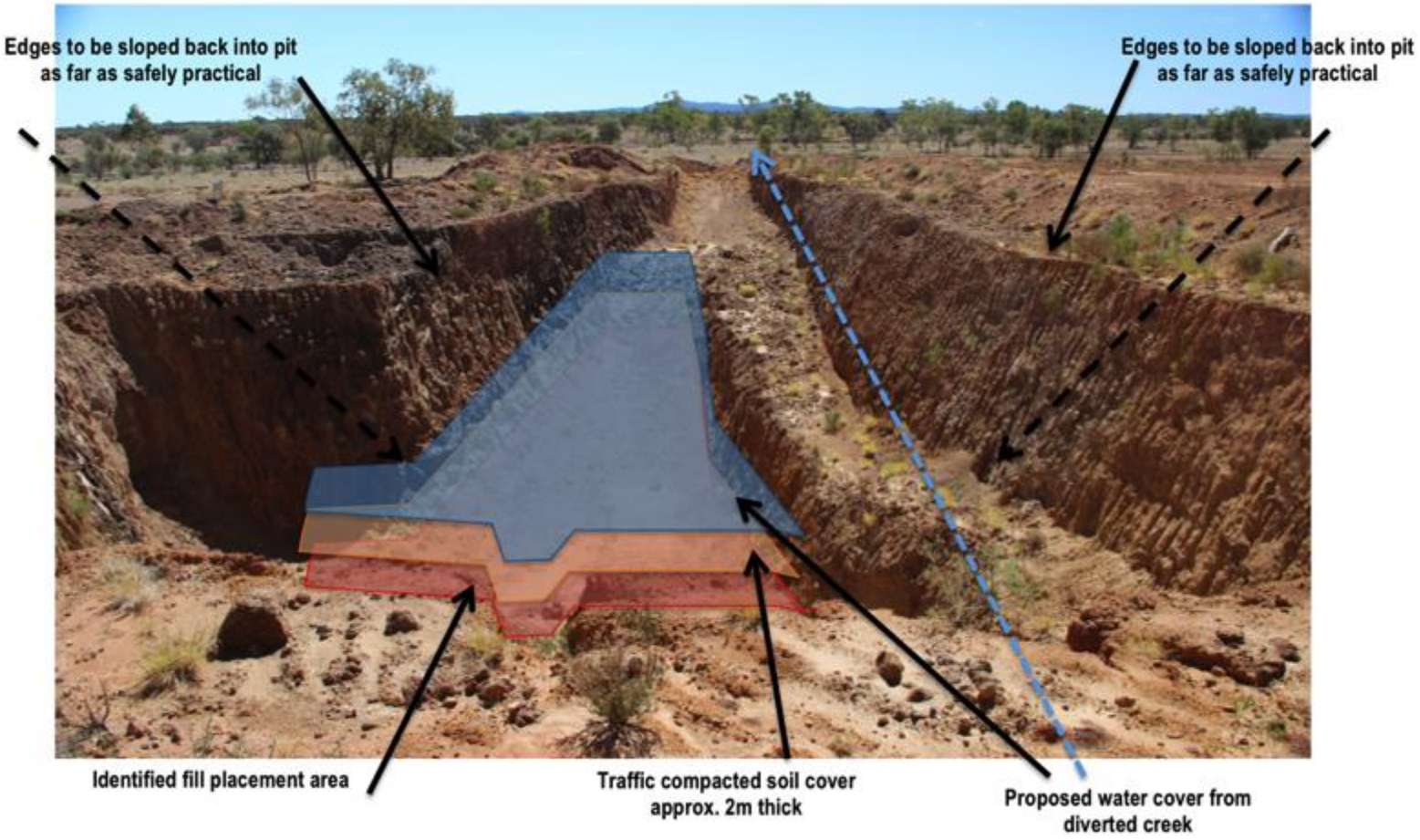

Figure 20 - Pit B Conceptual Design

9.9. DOMAIN 8: ACCOMMODATION/SITE CAMP

Figure 21 - Camp Facilities to be removed

Figure 22 - Example of camp garden plants to be removed

Figure 23 - Telstra equipment to remain (Pole and Solar Panel)

Figure 24 – Telstra equipment to remain (white equipment box)

Table 16 - Domain 8 Closure Tasks

Infrastructure	Closure Task/Activity
Infrastructure and buildings	• Disconnect and terminate services (water, power, communications) • Remove all signage, lights and other miscellaneous items • Disassemble and remove all pipelines and associated pumping infrastructure • Disassemble and remove small buildings / tanks / plant • Demolish / remove / bury concrete pads, structures, footings • Remove non native plant species from camp garden area • Dispose of polypipes • Remove swimming pool • Deep rip surface along the contour • Broadcast seeding
Sewage Facilities	• Disconnect and terminate services • Collapse tanks and backfill as per DoH advice

9.10. DOMAIN 9: AIRSTRIP

Figure 25 – Airstrip from waste dump old

Table 17 - Domain 9 Closure Tasks

Infrastructure	Closure Task/Activity
Airstrip	• Remove all miscellaneous items • Reshape to form free draining surfaces • Deep rip all surfaces along the contour • Broadcast seeding

9.11. DOMAIN 10: OVERBURDEN STOCKPILE PIT A

Figure 26 - Pit A Overburden

Table 18 - Domain 10 Closure Tasks

Infrastructure	Closure Task/Activity
Overburden Stockpile	• Primary earthworks to construct crest bund • Create concave surface • Primary earthworks to profile landform • Broadcast seeding

9.12. DOMAIN 11: OVERBURDEN STOCKPILE PIT B

Figure 27 - Pit B Overburden

Table 19 - Domain 11 Closure Tasks

Infrastructure	Closure Task/Activity
Overburden Stockpile	• Re-rip landform with contour ripping • This overburden stockpile is significantly smaller than that of the waste dumps and the overburden stockpile from Pit A. Due to its size (0.85ha) it not considered necessary to reshape the landform to create a water storage basin. The incidental rainfall will infiltrate the stockpile or shed along the contours. • Broadcast seeding

9.13. DOMAIN 12: ONSITE LANDFILL

Figure 28 – Onsite Landfill

Table 20 - Domain 12 Closure Tasks

Infrastructure	Closure Task/Activity
Landfill	• Record GPS details of landfill • Ensure no toxic or reactive waste is present in landfill • Compress and consolidate landfill material • Cover Landfill with material from waste dump • Heavy vehicle compaction of cover by use of dozer or loader • Shallow rip surface along contour • Broadcast seeding

10. CLOSURE MONITORING AND MAINTENANCE

Following mine closure, a 3-year monitoring program will be initiated as outlined in table 16. AVI will seek to have incremental bond return during this time as per table 16 and full relinquishment of Mineral Lease 165 will be sought after this period. The need for any ongoing monitoring will be reassessed and negotiated at the end of the 3-year period.

An audit of completion held with AVI and DME will be conducted upon completion of rehabilitation earthworks to validate works were completed to plan and to identify any additional works required to meet the completion criteria.

10.1. MONITORING COMPONENTS AND PHASES

Table 21 - Closure Monitoring Programme

	Aspect	Monitoring	Frequency	Duration
Pit A 1	Water Quality	pH, EC, TDS, TSS, Alkalinity, Al, As, Fe, Mn and Cu Final year – full suite	Annual	Years 1 – 3 post closure
Pit A 2				
Pit A 3				
Pit B (If water is present)				
Pit A and Pit B	Stability	Visual monitoring of walls and slopes and general landforms for evidence of erosion or instability Photographic monitoring Vegetation Establishment monitoring including basic quadrant survey and species diversity		Years 1 – 3 Post closure
Mineral Waste Dump Old	Stability			Years 1 – 3 Post closure
Mineral Waste Dump New				Years 1 – 3 Post closure
ROM area	Vegetation establishment			Years 1 – 3 Post closure
Camp area	Vegetation establishment			Years 1 – 3 Post closure

Photographic monitoring locations will be initially photographed upon completion of construction, again 3 months following construction then annually for three years post closure construction. Photographic monitoring sites will be established for each domain. Each domain will be photographed from directional aspects north, south, east and west. In larger domains several sites will be identified to ensure a full representation of the domain, its rehabilitation success and possible issues are adequately recorded. A photographic plan will be submitted upon completion of earth works to the DME for consideration.

All data and photographic records of all works associated with the MCP and its associated activities will be forward to the DME Alice Springs office on an annual basis or as requested.

11. MANAGEMENT OF INFORMATION AND DATA

All records pertaining to the mine, including the MCP and subsequent site visit reports will be maintained at the Imerys Minerals Australia Office, Glenelg Highway, Pittong, Victoria.

Copies of all relevant documentation, photographic records and site reports will be forwarded to the DME Alice Springs for Government record purposes as they become available.

12. APPENDICES

APPENDIX 1 – PRODUCTION BORE TRANSFER OF OWNERSHIP TO NT LAND CORPORATION

APPENDIX 2– EPBC ACT SEARCH

APPENDIX 3 – BORE REPORT

APPENDIX 4 - FLORA AND FAUNA REPORT

APPENDIX 5 – PIT WATER QUALITY REPORT

APPENDIX 6 – EARLY WORKS PLAN

APPENDIX 7 – ENRETECH BIOREMEDIATION FOR HYDROCARBON SOILS

APPENDIX 8 – DEPARTMENT OF MINES AND ENERGY LETTER 2013

APPENDIX 9 – NORTHERN TERRITORY SITE OF CONSERVATION SIGNIFICANCE MAP

APPENDIX 10 – NORTHERN TERRITORY ENVIRONMENTAL GUIDELINE FOR CONTAMINATED SITE REMEDIATION