




MAMATWAN MANGANESE (PTY) LTD

**MAMATWAN MANGANESE UNDERGROUND MINE ENVIRONMENTAL
MANAGEMENT SYSTEM PROCEDURE:**

BASIC ENVIRONMENTAL AWARENESS TRAINING PROCEDURE

EIA-AWP-145-12-13

Rev 0.1

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1. PURPOSE

The purpose of this document is:

- To ensure that all employees are made aware of the Mamatwan Manganese (Pty) Ltd environmental policy and the implication thereof.
- To ensure that all employees who might impact on the environment in the work place are appropriately trained.
- To ensure that all employees are trained in relation to their role in the environment.

2. INTRODUCTION

This Basic Environmental Awareness Procedure has been designed for the Mamatwan Manganese Mine to educate and increase awareness about issues related to the environment in the work place. This is to create awareness among personnel on management and action plans required in cases of environmental emergencies in the work place.

3. ABBREVIATIONS

EAP	Employee Assistance Program
HOD	Head of Department
MSDS	Material Safety Data Sheet
O&M	Operations and Maintenance
PPE	Personal Protective Equipment
SHE	Safety, Health and Environment

4. CONCEPTS

- **Environment:** the surroundings in which the company operates (including air, water, land, natural resources, flora, fauna, humans and their interrelation).
- **Environmental Aspect:** the element of the site operations; activities or products or services that can interact and may cause a change to the environment. It is the reason why the impact occurs.
- **Environmental Impact:** the physical changes to the environment, whether adverse or beneficial, resulting from the Mamatwan Manganese's environmental aspects.
- **Hazardous substances:** Substances scheduled in the Hazardous Substances Act (No. 15 of 1973) and Hazardous Chemical Substances Regulations (August 1995). These include fuels, oils, solvents, cement, pesticides, etc.
- **Pollution:** Pollution is any change in the environment caused by:
 - Substances
 - Radioactive or other substances
 - Noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any other person or organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems or on material useful to people, or will have such an effect in the future.

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5. INITIAL AWARENESS

5.1 Induction

All full time staff and contractors, as well as visitors are required to attend an induction session. Employees should be inducted when they commence with employment at the mine as well as when they return from leave. Any contractor, who works on the mine for a period of 24 hours or more, is required to undergo the respective induction.

Environmental issues and aspects related to the mine and its operations will be addressed in the induction sessions. All environmental impacts and aspects as well as their mitigatory measures will be discussed, explained and communicated.

The structure of the induction program may include:

- Welcome and Registration;
- Induction content and assessment;
- Induction Documents Issued;
- Disciplinary Code;
- Fire Extinguisher;
- Personal Protective Equipment (PPE);
- Employee Assistance Program (EAP);
- Overall security; and
- HIV/Aids Awareness.

6. ENVIRONMENTAL ISSUES

6.1 Hazardous substances spillage and clean up

6.1.1 Legislated requirements

- Hazardous Substances Act (No. 15 of 1973); and
- Hazardous Chemical Substances Regulations (August 1995).

6.1.2 Objective

To ensure safe and proper storage, handling and disposal of hazardous substances on the mine so as to avoid environmental pollution and human health risks.

6.1.3 Performance indicators

No pollution incidents reported or observed on the Site.

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6.1.4 Procedures

- All hazardous substances, as scheduled by the Hazardous Substances Act (No. 15 of 1973), shall be strictly handled, stored and disposed of as per the manufacturer's specifications. Material Safety Data Sheets (MSDS) for all hazardous materials used on site shall be available on the Emergency Controller's environmental file for reference e.g. in first aid cases, to guide personal protective equipment use, to guide spill clean ups etc.;
- The storage areas for hazardous substances shall meet the requirements of all related safety legislation and shall be sanctioned by the Safety, Health and Environmental (SHE) Manager; and
- No hazardous substances or hazardous waste may be disposed of on the Site. This shall be directed to a registered, licensed, hazardous waste disposal facility.

6.1.5 Monitoring and reporting

The SHE Manager shall inspect storage or handling areas regularly to ensure that they meet safety requirements and any suspected hazardous substances spillage would immediately be investigated or cleaned. The external environmental auditor is to check if any hazardous substances are stored or utilised on site and that the correct procedures are followed, including that of the relevant MSDS on file.

6.1.6 Responsibilities

The SHE Manager is responsible for the implementation of these specifications on site.

6.2 Maintenance and Infrastructure management

This deals with the maintenance of infrastructure e.g. signage, access roads, dams, etc.

6.2.1 Objective

- To ensure that no ecological degradation takes place as a result of poorly maintained roads or drainage line crossings e.g. erosion or poor fencing or damage to rehabilitated areas;
- To ensure that no ecological degradation takes place as a result of poorly maintained dams e.g. spillages, erosion, etc.; and
- To limit visual impact by avoiding the establishment of indiscrete signage on site.

6.2.2 Performance indicators

- Infrastructure visibly in a good state and operational areas kept tidy;
- The footprint of the operations and vehicular circulation is clearly defined and indicating areas that restricts movement;
- Roads are stable and in a good state;
- Groundwater storage dam is maintained and in a good state; and
- Fences and gates are in a good state.

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6.2.3 Procedures

6.2.3.1 Access Roads

- All access roads are to be maintained in a good condition, all significant erosion repaired and affected road section stabilised; and
- Stormwater culverts, road side stormwater gully and deflection humps across the roads shall be maintained in a good state and kept free of debris.

6.2.3.2 Fences and Gates

- All permanent fencing and access and security gates erected shall be maintained in a neat and good condition for the lifespan of the project; and
- The fence line and gates shall be inspected minimum monthly and any required maintenance work scheduled. All wire strands left over from maintenance work shall be correctly stored in a safe confined space.

6.2.3.3 General infrastructure

- All infrastructures must be maintained and any damage repaired regularly to remain in a functional and aesthetically pleasing condition at all times;
- All operational areas shall be kept neat and tidy at all times;
- The footprint of the operations and maintenance facilities, parking and vehicular circulation must be clearly defined e.g. through the use of fencing and markers where practical, to avoid movement in areas restricted of movement and operations;
- Signage should be discrete and confined to entrance gates and no corporate or advertising signage in the form of Billboards should be allowed;
- Danger signs and signs indicating the location of fire equipment, etc. should be visible and placed strategically;
- Regular inspections of operational equipment such as vehicles, pumps, etc. in order to minimise any environmental incidents due to spillage, flooding, etc.; and
- All unnecessary signage should be avoided.

6.2.4 Monitoring and reporting

The Operations and Maintenance (O&M) Manager shall undertake visual spot checks on a fortnightly basis to check for deterioration or incidental damage of infrastructure and plan and carry out maintenance accordingly. The O&E Manager shall inspect operational equipment at least three (3) times a week to ensure sufficient working order. An external environmental auditor shall check that all infrastructures are in a good state.

6.2.5 Responsibilities

The O&E Manager is responsible for maintaining all infrastructures under their control in a functional and aesthetically pleasing condition.

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6.3 Rehabilitation and identification and eradication of alien invasive plants

6.3.1 Legislated requirements

Conservation of Agricultural Resources Act (Act 43 of 1983) Regulation 15 (removal of weeds/invaders).

6.3.2 Objective

Establishment of vegetation in disturbed and mined areas, where feasible to stabilise the site, improve aesthetics and provide improved habitat.

6.3.3 Performance indicators

- Evidence of germination and successful establishment of vegetation in areas prepared for rehabilitation;
- No areas of poor vegetation cover in rehabilitation locations previously disturbed by mining;
- No alien invasive plants (in terms of Conservation of Agricultural Resources Act) or otherwise prohibited plant species are present in the rehabilitation areas;
- No damage/pollution to the environment through the indiscriminate use of herbicides observed; and
- Natural vegetation showing signs of vitality will be acceptable rather than lack of significant senescent vegetation.

6.3.4 Procedures

6.3.4.1 Vegetation recovery

- The SHE Manager is to draw up a rehabilitation maintenance schedule and related budget for ensuring the continued development of vegetation in rehabilitation areas. This is to allow for alien plant control, over seeding where required and initial irrigation of seeded areas/transplant if required;
- Focus of rehabilitation planning should be on disturbed areas; and
- All areas must be cleared of alien vegetation.

6.3.4.2 Erosion repair

The following areas are to be inspected for successful seed germination subsequent to rehabilitation interventions undertaken at the closure:

- The sides of the main and secondary access roads; and
- Areas around the shaft and groundwater storage dam.

Only suitable locally indigenous plant species should be utilised for rehabilitation or planting anywhere on site.

6.3.4.3 Removal of Alien Invasive Plants

- All rehabilitated areas and areas of natural vegetation shall be kept free of alien plant seedlings and coppice;

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- All Category 1, 2 and 3 alien invasive vegetation, as directed by the National Conservation of Agricultural Resources Act (Act 43 of 1983) or any amendments thereto, are to be removed from the Site on a continuous basis;
- The Department of Water Affairs' approved methodology should be employed for all alien clearing operations;
- The plants should preferably be pulled by hand while young. Seedlings should not be allowed to grow to a size where they have reached seed bearing age or requiring expensive mechanical or chemical controls;
- No bulldozing or mechanical removal is allowed. All stems must be cut as close to ground level as possible, using loppers or chainsaws (depending on size), and stumps must be immediately hand painted with a suitable Triclopyr herbicide (e.g. Garlon, Timbrel, with colour dye) to prevent re-sprouting;
- No herbicide spraying should be undertaken anywhere within natural vegetation. All cut branches should be stacked into a pyramid (cut ends up) and left to dry. Annual follow-ups are required in all areas that have been previously cleared. Small seedlings may be hand pulled. All alien clearing should take place in the period October to April, to minimize damage to seasonal species; and
- All alien plant materials removed from the site are to be disposed of at an approved waste disposal site or chipped for mulch material. The burning or burying of the materials on site should not be allowed.

6.3.4.4 Use of Pesticides

- Insecticides shall not be used on site;
- Herbicides shall be used only in terms of alien plant control protocols. Only contact herbicides may be used e.g. Gyphosate based, none that are persistent in soil;
- Chemicals are not to be applied during rainy or windy periods;
- Painting on of chemicals is preferred to spraying, as this allows for better control of the area being affected;
- Only personnel wearing the appropriate protective clothing and using well maintained equipment designed for the purpose and supervised by a certified Pest Control Operator may apply herbicides;
- Any herbicides used must be applied per the manufacturer's specifications and must be registered for the target plant species;
- No chemicals may be stored on the site for any period of time, unless in suitably secure poisons store as per the specifications of the Occupational Health and Safety Act;
- No equipment used for application of chemicals may be washed anywhere on the site; and
- Empty poison containers shall be properly disposed of to a landfill site and no pesticide residue or equipment wash water may be disposed of or directed to the stormwater system on site.

6.3.5 Monitoring and reporting

The SHE Manager shall monitor all rehabilitation areas to ensure that they are establishing well and are free from alien invasive vegetation. An external environmental auditor is to comment on the progress and success of re-vegetation efforts.

6.3.6 Responsibilities

The Project Manager as well as SHE Manager is responsible for the ongoing maintenance of rehabilitation areas on site.

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6.4 Stormwater and erosion control

6.4.1 Legislated requirements

- Conservation of Agricultural Resources Act (No 43 of 1983) section 6.
- National Water Act, 1998 (Act 36 of 1998)

6.4.2 Objectives

- Prevent contamination of stormwater runoff from the facility to prevent pollution of receiving environments;
- Prevent localised flooding or water logging on site by ensuring that drainage lines or channels, culverts etc. are not impeded through sediment build up and debris and remain functional; and
- Avoid or minimize potential erosion by reducing the speed of drainage flows from the site and by maintaining the stability of slopes, embankments and previously disturbed areas on site.

6.4.3 Performance indicators

- No indication of significant erosion or sediment deposition on the Site; and
- Drainage lines, stormwater channels, swales and culverts are functional (i.e. in good state) and visibly free of significant litter, sediment and other contaminants.

6.4.4 Procedures

- Maintenance activities shall not lead to undue damage, blockages or disruption of the drainage lines or stormwater channels on site or concentrate stormwater sheet flow into erosive channels.
- Sediment to be removed on a need to basis from all drainage channels, swales as well as culverts and pipes under roads to prevent blocked pipes and erosion damage to road sides due to disrupted flow;
- Significant erosion in the drainage lines or stormwater channels or swales shall be addressed by implementing water slowing measures e.g. temporary straw bales or sand bags or permanent gabion weirs and stabilised overflows and crossings to prevent recurrence;
- All erosion channels anywhere on site shall be repaired immediately through backfilling with appropriate material and stabilising to prevent recurrence;
- Where vegetation has been washed away or damaged as a result of the erosion this shall be reinstated once the area has been stabilised;
- Stabilisation measures e.g. grass blocks shall be maintained in good state;
- No materials or waste shall be dumped into stormwater channels, in the drainage lines or their buffer zones. Any litter or foreign material blown or washed into these areas inadvertently is to be removed regularly (minimum monthly) without undue disturbance to the vegetation and stability of the area; and
- Fuel or oil or other chemical spills anywhere on site should be treated immediately with an appropriate spill kit.

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6.4.5 Monitoring and reporting

The Environmental official is to inspect the drainage lines and any other stormwater channels on site at least monthly and immediately after heavy rains for damage and foreign matter/litter and shall log pollution/obstruction incidences and plan maintenance activities accordingly. The external environmental auditor shall inspect the drainage lines and any other stormwater channels on site for evidence of significant erosion and pollution during formal audit inspections.

6.5 Water use

6.5.1 Legislated requirements

- National Water Act (No 36 of 1998): Section 3(3), 77, 21 and 22(2c).
- The proposed mine development and operations further also requires compliance with the National Water Act, 1998 (Act 36 of 1998). An application for an integrated water use licence in terms of Section 21 to undertake the following activities will be applied for:
 - (a) *taking water from a water resource;*
 - (b) *impeding or diverting the flow of water in a water course;*
 - (g) *disposing of waste in a manner which may detrimentally impact on a water resource;*
 - (i) *altering the bed, banks, course or characteristics of a water course*
 - (j) *removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.*

6.5.2 Objective

- To use water in a responsible way;
- To minimize consumption;
- To prevent wastage of this limited resource; and
- To prevent unauthorised waste water discharge.

6.5.3 Performance indicators

- No undue water wastage observed;
- No visible water leaks and/or seepage; and
- No unauthorised waste water discharge occurrences.

6.5.4 Procedures

6.5.4.1 Wastage

- Wastage of water shall be avoided at all times;
- Re-use and treat water where seen fit and possible; and
- All supply points shall remain properly closed when not in immediate use and all broken pipes or fittings shall be isolated immediately and repaired as soon as possible.

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6.5.4.2 Prevention of Water Pollution

The pollution of surface or groundwater shall be prevented. Such pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, water carrying soil particles or waste products etc.

6.5.5 Monitoring and reporting

- The line Manager shall monitor the project's water flow for purposes of the water balance as well as for water leaks or wasteful practices by staff;
- The external environmental auditor shall check that waste water is not discharged without the necessary authorization from the Department of Water Affairs; and
- The SHE Manager shall monitor significant water leaks and seepage.

6.5.6 Responsibilities

The project as well as SHE manager is responsible for implementing responsible water usage practices including the procedures stipulated above.

6.6 Dust Control

6.6.1 Legislated requirements

National Environmental Air Quality Act (No. 39 of 2004).

6.6.2 Objective

Minimize dust generation and associated nuisance.

6.6.3 Performance indicators

No evidence or reports of significant dust problems.

6.6.4 Procedures

- Operator vehicles to keep to a 40km/hr speed limit on gravel access roads on site to minimise dust generation;
- Use water for damping down dust on roads wherever possible; and
- Water utilised for dust suppression measures may not be raw (clean) water, but only water that is being reused and extracted from the water return dam or pollution control dam.

6.6.5 Monitoring and reporting

The SHE Manager must monitor for compliance as per the procedures above.

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6.6.6 Responsibilities

The SHE manager must ensure that adequate dust control measures are implemented on the Site.

7. ENVIRONMENTAL EDUCATION AND TRAINING

7.1 Environmental Symposiums

Environmental symposiums can be held with management, and selected groups of supervisors, foremen or employee representatives. This will take the form of an open discussion between the relevant department and these individuals. The symposiums will aid in environmental awareness being generated at all levels, as well as assist the relevant department in defining all but also with identifying new environmental issues, concerns and pollution sources.

7.2 In-House Training

In-house training sessions should be held with relevant employees as per the requirement of Mamatwan Manganese's Management systems. The training sessions should be determined by the relevant department. It will also allow for employees to participate in determining what the environmental issues and concerns are with regard to their specific occupation. Education with regard to environmental incident reporting will be detailed at these sessions.

7.3 On the Job Training

On the job training is an essential tool in environmental awareness. Employees should be given details of the expected environmental issues and concerns specifically related to their occupation. Employees should be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be on-going, and all new employees will be provided with the same standard of training as existing employees.

7.4 General Training and Skills Development

Human Resources Development Programmes should include appropriate training and skills development programmes as required by the workforce in support of operation specific business plans (both mining and non-mining related). Training will be offered in portable skills, being competencies that will enable employees to find jobs elsewhere within the mining industry, or to become self-employed. Basic environmental and pollution control skills should be included in this training.

7.5 Other

Environmental Steering committees could work to increase awareness in the community regarding environmental constraints and opportunities. At corporate level, this includes providing support for Non-Governmental Organisations (NGOs) involved with specific environmental awareness programmes. It will be the responsibility of the proponent to set up the Environmental Steering committee.

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8. ENVIRONMENTAL COMMUNICATION

Environmental incident reporting is a vital part of communication. Employees are required to report any and all environmentally related problems, incidents and pollution, so that the appropriate mitigatory action can be implemented timeously. In the event of an Environmental Incident the reporting procedure as indicated in *Figure 1* should be followed:

ENVIRONMENTAL INCIDENT REPORTING STRUCTURE	ACTION REQUIRED
Line Management in relevant area of responsibility where the incident occurred	<p>Shall investigate the incident and record the following information:</p> <ul style="list-style-type: none"> o How the incident happened; o The reasons the incident happened; o How rehabilitation or clean up needs to take place; o The nature of the impact that occurred; o The type of work, process or equipment involved; and o Recommendations to avoid future such incidents and/or occurrences. <p>Shall inform the Environmental Manager and the Mine Manager on a daily basis of all incidents that were reported in the area/section.</p> <p>Shall consult with the relevant department / person for recommendations on actions to be taken or implemented where appropriate (e.g. clean-ups).</p> <p>Shall assist the Environmental Manager and/or Mine Manager with applicable data in order to accurately capture the incident into the reporting database.</p>
Area / Line Managers	<p>Shall forward a copy of the incident form to other line managers.</p> <p>Shall forward a copy of the incident form to the Environmental Manager and the Mine Manager.</p> <p>Shall inform the relevant department / person on a weekly basis of the incident by e-mail or by submitting a copy of the incident report. Once a High Risk Incident (any incident which results from a significant aspect and has the potential to cause a significant impact on the environment) occurred it must be reported immediately to the Environmental Manager and the Mine Manager by telephone or email to ensure immediate response / action.</p> <p>Shall forward a copy of the completed Incident Reporting Form (and where applicable a copy of the incident investigation) to the relevant department / person.</p>
Environmental Manager / Mine Manager	<p>Shall complete an incident assessment form to assess what level of incident occurred.</p> <p>Shall make recommendations for clean-up and / or appropriate alternate actions.</p> <p>Shall enter actions necessary to remediate environmental impacts into the database in conjunction with the responsible line manager.</p> <p>Shall enter the incident onto the database in order to monitor the root causes of incidents.</p> <p>Shall include the reported incidents in an appropriate monthly / quarterly report.</p> <p>Shall highlight all incidents for discussion at HSEC meetings.</p>

Figure 1: Environmental Incident Reporting Structure

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9. MANAGEMENT REVIEW

The SHE Department will be responsible to ensure this procedure remains current as to ensure that reviews will be made and will be dealt with on a regular basis.

10. DECLARATION AND APPROVAL

The objective of the declarations below is for the person responsible for implementation of this plan to declare that they understand the plan and undertake to implement it and for the Safety, Health and Environmental Manager to approve this plan.

A. Mine Manager - Declaration

I, _____, declare herewith that I understand this Environmental Awareness Plan, and undertake to ensure the implementation of the plan.

Print Name

Signed

Date

B. Safety, Health and Environmental Manager - Approval

I, _____, hereby approve the works described in this Environmental Awareness.

Print Name

Signed

Date