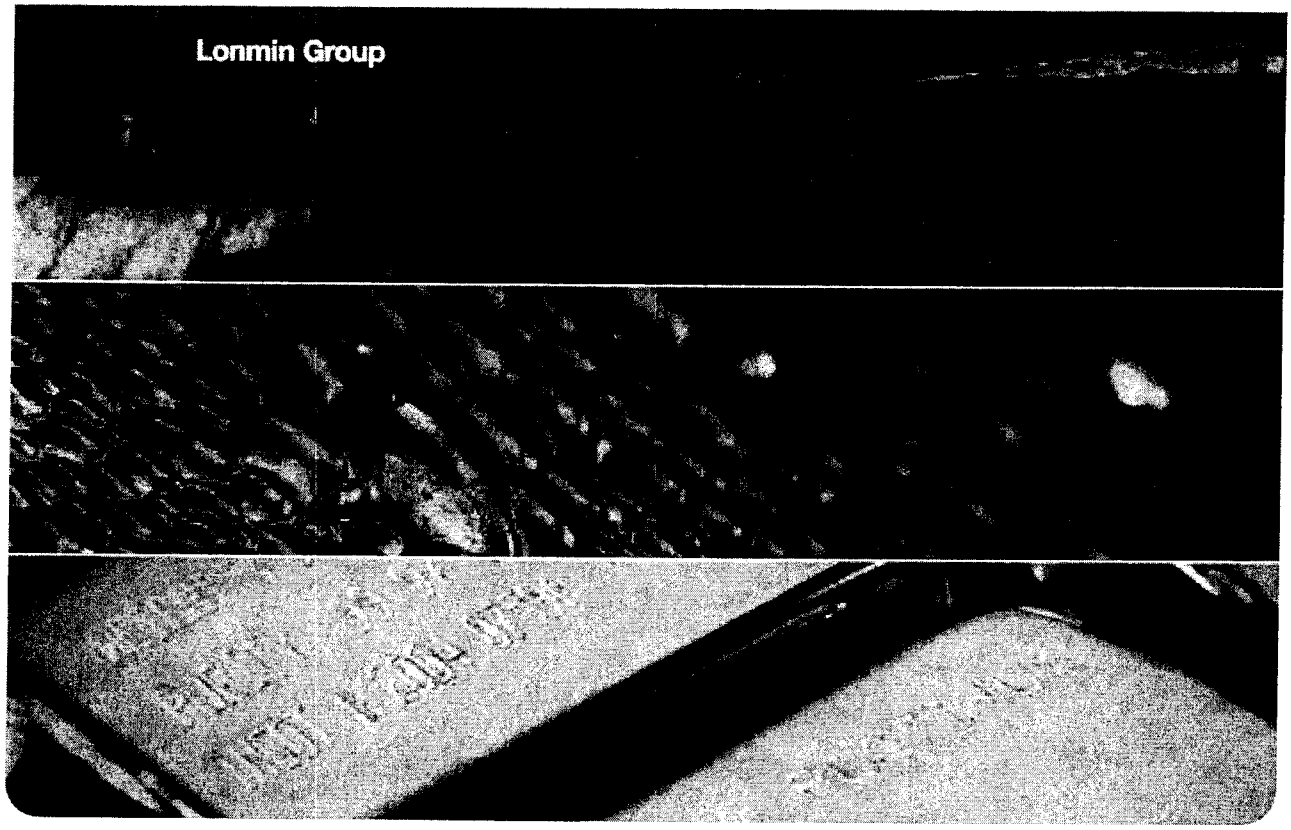
LONMIN
PLATINUM



Eastern Platinum Mine

Environmental Management Programme Report

November 2005

Volume 1

PROJECT NAME: **ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT – EASTERN PLATINUM MINE**

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6 ENVIRONMENTAL MANAGEMENT PROGRAMME

6.1 Lonmin Vision

"We are Lonmin, a primary producer of Platinum Group Metals. We create value by the discovery, acquisition, development and marketing of minerals and metals. We respect the communities and nations that host our operations and conduct business in a sustainable, socially and environmentally responsible way."

6.2 Lonmin Charter

"Our Mission: -

- To grow and build our portfolio of high quality business;
- To deliver the requirements of the South African broad based socio-economic Mining Charter and we welcome the opportunity to transform our business;
- To build a value-based culture, which is founded on safe work, continuous improvement, common standards and procedures, community involvement and one that rewards employees for high performance."

"We are successful when: -

- Our employees live and work safely and experience the personal satisfaction that comes with high performance and recognition;
- Our shareholders are realising a superior total return on their investment and support our corporate sustainability values;
- The communities in which we operate value our relationships;
- We are meeting our commitments to all business partners and our suppliers, contractors, partners and customers support our Charter."

"Our values: -

- Zero Harm – We are committed to zero harm to people and the environment;
- Integrity, Honesty and Trust – We are committed ethical people who do what we say we will do;
- Transparency – Open, honest communication and free sharing of information;
- Respect for Each Other – Embracing our diversity enriched by openness, sharing, trust, teamwork and involvement;
- High Performance – Stretching our individual and team capabilities to achieve innovative and superior outcomes;
- Employee Self-worth – To enhance the quality of life for our employees and their families and promote self esteem."

6.3 Lonmin Commitments

"In order to meet this vision and our value of Zero Harm, Lonmin is committed to: -

- Implementing and maintaining effective safety, health and environmental management systems that drive continual improvement;
- The identification, assessment and management of risks to employees, contractors, the environment and communities in which we operate;
- Ensuring employee knowledge of the safety, health and environmental risks by effective assessment and training;
- The reduction, re-use and recycling of waste to minimise final disposal and promote the efficient use of natural resources;
- Preventing and reducing all forms of pollution by employing effective technologies;
- Making adequate financial provision during the expected life of our operations to ensure sustainable life when operations cease;
- Meeting and where applicable exceeding legal requirements;
- Maintaining transparent, consultative relationships with all stakeholders through effective communication channels;
- Supporting the fundamental human rights of employees, contractors and the communities in which we operate;
- Respecting the traditional rights of indigenous peoples; and
- Contributing to the long-term social, economic and institutional development of our employees and the communities within which our operations are located."

6.4 Environmental Objectives, Targets and Mitigating Measures

The environmental objectives, commitments and mitigatory measures for each of the environmental impacts, socio-economic conditions and historical and cultural aspects identified, for each phase of the mining operation, have been detailed in the sections below. Objectives, commitments or mitigatory measures that are applicable to more than one aspect have not been repeated for each aspect but rather a reference made to the applicable section, for example, dust control will impact on surface water quality, air quality and socio-economic conditions and yet has only been mentioned in the section on air quality. Aspects relating to Occupational Health and Safety have not been included in the EMPR, the Lonmin OHS Report is however available from the mine upon request. The Lonmin ISO 14 001 procedures will be adhered to, to ensure minimal environmental impact.

Accountability for all commitments will reside with the Mine Manager of the business unit, although responsibility of fulfilling commitments can be delegated to line management. The Group Manager Environment is responsible for monitoring compliance with EMPR commitments as stipulated in the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002).

6.4.1 Geology

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Removal of bedrock and ore body.	General	Overall Management Objectives	• To ensure that optimal use is made of the available mineral resource. • To reduce the risk of failure of structures, especially where there is a risk of injury to humans and animals.	Mine Manager Mine Manager	Annual review Ongoing
	Construction	Objective	To ensure that construction does not limit the potential to exploit deeper resources.	Mine Manager	Construction phase
	Opencast - Operation	**Opencast** - Mitigatory Measures	The temporary overburden stockpiles for Opencast mining will be returned back into the void.	**Opencast** Mine Manager	Operational phase

Refer to Topography for mitigatory measures related to surface subsidence.

6.4.2 Topography

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
A change in topography due to infrastructure, residue deposits, and the mine workings	General	Overall Management Objectives	To limit impacts on drainage and the aesthetic quality of the environment due to changes in the topography.	Engineering Manager	Ongoing
	Opencast - Prior to Construction	**Opencast** - Mitigatory Measures	Obtain records of original landforms for final rehabilitation.	**Opencast** Mine Manager	Prior to construction
	Opencast - Construction, Operation, Decommissioning and Closure	**Opencast** - Mitigatory Measures	Mitigatory measures relating to the final shaping of the landform: • The temporary overburden stockpiles will be returned back into the void ensuring that no stockpiles of materials will remain within the opencast mining areas subsequent to rehabilitation. • The elevations of the rehabilitated surface will be slightly higher along the highwall to accommodate differential settlement. • Additional shaping of the topography will ensure that no rapid change in gradient will occur. • The maximum gradient of any slope will not exceed 18°. • All areas will be free draining after rehabilitation.	**Opencast** Mine Manager and Survey Department	During rehabilitation of the opencast voids

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
	Underground Mining - Construction and Operation	**Underground Mining -** Mitigatory Measures	Mitigatory measures for minimising surface subsidence: • All underground mine workings are restricted to a minimum depth of 30m from surface. • Underground support pillars are left insitu. • An active surface subsidence monitoring programme, in accordance with the specifications of the DME's Directive of Mine Surveyors, is in place at **EPM**. • EPM will investigate formal claims that subsidence has been induced by its mining activities. Where it is clear EPM has caused the subsidence, EPM will implement appropriate mitigation measures timeously. These mitigation measures may include repair of damaged infrastructure, landscaping and rehabilitation.	Mine Manager Mine Manager Chief Surveyor Mine Manager	Ongoing Ongoing Ongoing When applicable
	Decommissioning & Closure	General Mitigatory Measures	• To return the area, as far as possible, to a topography as agreed upon in consultation with stakeholders. • The decommissioned shafts and surface excavations at **EPM** will be closed as required in terms of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002).	Mine Manager	Closure

6.4.3 Soil

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Soil degradation	General	Overall Management Objectives	• Minimise the disturbance and loss of topsoil. • Protect the soil surface from impacts relating to erosive and non-erosive soil degradation (loss of topsoil, erosion, pollution, removal and compaction). • Ensure that the agricultural potential of the soil is maintained.	Engineering Manager	Ongoing
Loss of topsoil	Construction and Operation	Mitigatory Measures	**Topsoil handling:** • Topsoil is to be stripped and removed from all new development areas prior to construction, except in conditions where topsoil is utilised for a sealant purposes against seepage. • Topsoil that is stripped is to be removed to demarcated topsoil stockpile areas with as little compaction as possible. • Single handling of topsoil will be practised where possible. **Topsoil stockpiles:** • Soil stockpiles must be outside the 1:100 year floodline of any watercourse. • Erosion protection measures will be put in place at the soil stockpile areas, for example low-level berms. • Topsoil stockpiles will not be higher than 10m.	Engineering Manager Engineering Manager Engineering Manager Engineering Manager Engineering Manager Engineering Manager	Prior to construction During construction Ongoing Ongoing When required Ongoing

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Impacts on soil due to erosion, pollution, removal and compaction	Construction and Operation	Mitigatory Measures	**General:** • Footprint areas for construction activities will be kept to a minimum. • The number of tracks and access roads on site will be kept to a minimum, and where possible existing tracks and roads should be used. • All residue deposits will be managed according to **EPM**'s Code of Practices. **Soil Erosion:** • **EPM** shall take measures (e.g. installation of temporary and permanent drainage works, construction of berms, contouring of land, establishment of vegetation etc) to ensure that there is no undue soil erosion due to mining related activities. • All forms of erosion will be mitigated within 6 months. • The following infrastructure will be inspected and eroded areas will be repaired when and if necessary: - - Linear infrastructure (roads – particularly untarred roads, railway lines and pipelines); - All surface water management infrastructures (canals and bunds).	Engineering Manager	Ongoing
			Soil Pollution: • All hazardous material spillages will be managed according to the Lonmin ISO 14 001 procedure to ensure minimal environmental impact. **Soil mining (removal of soil):** • **Opencast** - The opencast voids will be backfilled after mining with the weathered bedrock and sub-soils. Following backfilling, topsoil will be replaced to approximately 300 mm.	Engineering Manager Mine Manager	Ongoing
Impacts on	Decommissioning	Management	• To ensure that dust and erosion is oppressed through	Engineering Manager	Decommissioning

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
		Commitments	successful rehabilitation.		
soil due to erosion, pollution, and compaction	and Closure	Mitigatory Measures	• **Opencast** – Where the land use is returned to agriculture, low-level berms are to be provided to inhibit erosion where required. • Remove and/or treat all soils that are a source of pollution. • Sediments must be removed from the shaft sludge ponds when these structures are decommissioned.	Engineering Manager	& closure

6.4.4 Land Capability and Land Use

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
The potential loss of agricultural and wilderness land due to land transformation and/or soil degradation	General	General Management Objectives	• Develop in line with the goals and objectives stated in the LDO/IDP. • Ensure that the land capability of the area other than the site is not altered by mining operations. • Limit and manage the loss of arable agricultural land.	Mine Manager	Ongoing
	Construction and Operation	Mitigatory Measures	Restrict development and infrastructure to demarcated areas.	Mine Manager	Construction
	Decommissioning and Closure	Mitigatory Measures	• In consultation with stakeholders, return the land use, as far as possible, to the pre-mining land use. • Ensure that no further land is sterilised during the rehabilitation of tailings facilities and waste rock dumps. • Ensure that the tailings facilities are a productive landmass at closure.	Mine Manager	Decommissioning

Refer to Soils for mitigatory measures related to soil degradation (loss of topsoil, erosion, pollution, removal and compaction).

6.4.5 Biodiversity

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Habitat fragmentation, destruction and species loss	General	Overall Management Objectives	• Limit further habitat disturbance and fragmentation within the boundaries of the mine. • Minimise impacts to natural flora and fauna, for example due to hunting, harvesting, dust etc.	Mine Manager Lonmin Environmental Center	Ongoing
		Overall Management Commitments	• Continue with a Bio-monitoring Programme for the river systems that transect the mines boundary. • Implement and monitor plans to control the spread of alien and invader plant species. • Undertake training and awareness programmes, with regards to the protection of natural systems and the importance of biodiversity, with all staff and contractors.	Engineering Manager Mine Manager Mine Manager / Training Personnel	Ongoing
Habitat fragmentation and destruction	Construction and Operation	Mitigatory Measures	• The number of tracks and access roads on site will be kept to a minimum, and where possible existing tracks and roads should be used. Where additional roads are required they must be strategically placed so as to limit habitat fragmentation. • Restrict development and infrastructure to demarcated areas. • Manage firebreaks to prevent destruction and damage to vegetation.	Engineering Manager	Ongoing
Reduction in species diversity	Construction and Operation	Mitigatory Measures	• Materials such as sand and stone should, wherever possible, be sourced from areas that are free of alien plants in order to avoid the spread of alien species. • The use of herbicides and pesticides should be limited as far as possible. • Waste must be contained and managed as to reduce the possibility of the occurrence of pest animal species. • If threatened or rare species are identified, contact the relevant authorities for advice before taking any	Engineering Manager	Ongoing

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
			action.		
Habitat fragmentation, destruction and species loss	Decommissioning and Closure		Re-vegetation shall take through natural re-seeding. Should natural re-seeding not be successful re-vegetation will make use of indigenous vegetation.	Engineering Manager	Ongoing

Refer to Soils for mitigatory measures related to soil erosion

Refer to Air Quality for mitigatory measures related to dust control

6.4.6 Water Resources

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Potential adverse impacts on surface and groundwater resources, in terms of quality and quantity.	General	Corporate Objectives	Zero surface discharge to the environment.	Mine Manager	September 2006
			100 % legal compliance in terms of Regulation 704 of the National Water Act, 1998 (Act 36 of 1998) and Lonmin permit conditions (refer to mitigatory measures below for the requirements of R704).	Mine Manager	September 2006
		Corporate targets	Reduce Lonmin's aggregate fresh water consumption by 10% per unit of production (2007).	Mine Manager	2007
	Construction and Operation	Mitigatory Measures – General prevention of water pollution and the protection of water resources	• Ongoing water monitoring of the receiving water environment, stormwater effluent discharge points and bio-monitoring sites. Both the quality and quantity of discharge must be monitored according to the conditions of the Water Use Licence. • Continue calibrating the groundwater flow and mass transport models. • Education of mine staff on the potential impacts on the receiving environment including prevention of these impacts. • Where practical, all future water management facilities, residue deposits and associated infrastructure are to be designed, located, constructed and maintained to minimise water resource pollution, damage to riparian or in stream habitat through erosion, sedimentation, disturbance of vegetation or the alteration of flow characteristics. • Ensure that all residue deposits are designed that the waste or water therein will not impair the structures stability or cause its failure. • As far as practically possible, ensure that surface water does not artificially recharge ground water. • Recycle process water as far as practically possible. • Ensure all water systems are free of obstructions. • All domestic waste and wash water to be disposed of as per permit requirements.	Mine Manager	Ongoing

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
	Construction and Operation	Mitigatory Measures – Restrictions on locality of activities and structures	• No future residue deposit or water management facilities may be within the 1:100 year floodline or within 100m of a water resource unless prior permission is obtained from local authorities, or on ground likely to become water-logged, unstable or cracked. • **Opencast** - No future mining or prospecting may take place within the 1:50 year floodline or within 100m horizontal from a water resource without prior permission from the relevant authorities. • No substances that may pollute the water resource are to be placed underground or within the opencast mining pits or any other excavations. • No future sanitary convenience, fuel deposit, reservoir or depots that may pollute the water resource may be within the 1:50 year floodline.	Mine Manager	Ongoing
	Construction and Operation	Mitigatory Measures – Restrictions on use of materials	• No material that may pollute a water resource may be used in constructing dams, roads, walls and/or berms.	Mine Manager	Ongoing
	Construction and Operation	Mitigatory Measures – Capacity requirements of clean and dirty water systems	• Clean and dirty water systems to be separated. • All dirty water dams (that are required to accumulate and control Stormwater) and tailings facilities to have a freeboard of 0.8 metres. • All water management facilities (that are required to accumulate and control Stormwater) to be designed, constructed, maintained and operated to accommodate the 1:50 year flood. • Ensure wastewater treatment facilities are operating effectively and in compliance to permit conditions. • Design all new facilities based on the concept of zero discharge (e.g. tailings facilities, waste rock facilities, solid waste landfill sites etc) and in line with all legal requirements (e.g. dam safety).	Mine Manager	Ongoing
	Construction and Operation	Mitigatory Measures – Access control and security (R704)	• All hazardous water management facilities and residue deposits to be fenced and have the necessary warning signs. • Control access to all residue deposits or water management facilities that may potentially have a negative impact on the water resource.		

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
		Mitigatory Measures- Winning sand and alluvial minerals from a watercourse	Ensure the following control measures are in place to prevent oil, grease, fuel or chemicals from reaching a water resource: - The fuel supplier shall provide and maintain bund walls around his fuel storage areas within the site. Such walls shall be of a sufficient height to contain 110% of the entire contents of his fuel storage facilities. This shall apply to storage above ground. - Soil contaminated by oil, fuel or chemical leakage shall either be removed and placed in disposal areas as directed by the Lonmin Environmental Center or shall be rehabilitated in situ; - All relevant employees are to be trained on waste management and petro-chemical spill ISO14001 procedures according to the training matrix; - Waste runoff water from the vehicle wash bay, workshop and diesel / fuel tank area shall be collected in a series of covered conservancy tanks/oil traps to firstly settle silt and secondly to remove oil. The oil sludge collected shall be disposed of at an approved hazardous waste disposal site or collected by a recycling company. Water from conservancy tanks shall be discharged into the sewage or mine dirty water system. - All spillage of oil onto concrete surfaces shall be controlled by the use of an approved absorbent material. - All old oils shall be retained for re-use/recycling by the supplier/recycling company. - Concrete shall be mixed only in areas, which have been specially demarcated for this purpose. All concrete that is spilled outside these areas, shall be promptly removed and taken to an approved landfill site. After all concrete mixing is complete, all waste concrete shall be removed from the batching area and disposed of at an approved landfill site. Stormwater shall not be allowed to flow through the batching area.	Engineering Manager	Ongoing

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
	Decommissioning and Closure	Mitigatory measures	• All pollution control mechanisms are to be in accordance with R704. • Ensure that all necessary pollution control mechanisms are protected and repaired or established when stockpiles or residue deposits are reclaimed, removed or rehabilitated so that water pollution is avoided and abated. • Ongoing water monitoring of the receiving water environment and bio-monitoring sites in accordance with the conditions of the Water Use Licence.	Engineering Manager	During decommissioning & closure

Refer to Soils for mitigatory measures related to soil erosion

Refer to Air Quality for mitigatory measures related to dust control

6.4.7 Air Quality

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
The main pollutants in terms of air quality are particulates	General	Overall Management Objective	Ensure that the air quality within the main impact zone of **EPM** is maintained at a level complying with ambient air quality guidelines and standards.	Engineering Manager	Ongoing
		Overall Management Commitments	• Monitor and minimise emissions of hazardous chemical compounds. • Monitor and manage airborne particulate emissions and dustfall deposition. • Maintain, and if required expand, the air quality monitoring and management network. • Minimise the health risks due to air contaminants generated within the main impact zone. • Avoid or minimise negative impacts on surrounding flora and fauna due to air contaminants generated by **EPM**.	Engineering Manager	Ongoing

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
	Construction and Operation	Mitigatory Measures	• Should dust emission from mining operations prove to be excessive on dust roads and/or in close proximity to communities, dust suppression techniques will be applied. • Where practically possible, excessive dust created by drilling, surface blasting, loading and unloading, mobile equipment and dust blows will be suppressed • Smoke emissions will be avoided by ensuring adequate training in fire prevention practices and fire management. Waste and plastics are prohibited from being burnt on the mine. • Continuous monitoring and rationalization of dustfall deposition. • Ongoing PM10 monitoring. • The Codes of Practice for residue deposits will be strictly adhered to. • The sides of active tailings dams are to be vegetated to reduce dust blows. • Re-vegetate dormant tailings dams. • Control and minimise where possible vehicles and machinery on tailings dams. • Access roads should be kept to a minimum, and where possible existing tracks should be used and maintained. • Implement mandatory dust control measures on gravel roads around mine tailings facilities.	Engineering Manager	When necessary When necessary Ongoing Ongoing Ongoing Ongoing Ongoing When necessary Ongoing Ongoing

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
	Decommissioning and Closure	Mitigatory Measures	• Excessive dust resulting from decommissioning activities will be suppressed using dust suppression techniques. • The waste rock dumps will be reclaimed, used for building aggregate or re-habilitated. • Evaluate and implement effective capping of dormant tailings dams. • Revegetate the slopes and surface of all tailings dams.	Engineering Manager Mine Manager	Decommissioning
	Post Closure	Mitigatory Measures	• Restrict access on all tailings dams. • Maintain vegetation cover on the slopes and surface of all tailings dams.	Mine Manager	Post closure

6.4.8 Noise, Vibration and Shock

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Increased noise and vibration levels	General	General Management Objectives	Ensure that noise levels from mining activities do not significantly affect staff at the site or people in the surrounding communities.	Engineering Manager	Ongoing
		General Management Commitments	• Design and implement a hearing conservation programme for employees and contractors. • Formal complaints about mining related noise and/or vibrations will be investigated and appropriate mitigatory measures implemented where the complaints are found to be valid.	Engineering Manager	Update annually
	Construction and Operation	Mitigatory Measures - Noise	• Conduct base line noise survey on perimeter and monitor noise against base line standards for ambient noise levels. • Mobile equipment noise: - Use designated routes; - Fit efficient silencers and enclose engine compartments; - Damp mechanical vibrations where practicable; - Ensure that all machinery and vehicles are well maintained. • Fixed plant noise: - Reduce noise at source by damping through acoustic treatment and applying silencing equipment as far as practicable. - Isolate source by enclosure in acoustic building, room etc. - Erect bank, screen or barrier. - Carefully select fixed plant site.	Engineering Manager	Ongoing

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
	Construction and Operation	Mitigatory Measures - Vibration	• Eskom is notified prior to blasting in the vicinity of the powerlines. • All persons within a 500m radius of an area where blasting will take place, shall be requested to vacate their dwellings prior to any blasting. • Atmospheric conditions should be considered before charging and blasting • Air blasting vibrations: - Use low energy detonating fuse or eliminate; - Use drop ball to eliminate secondary blasting. • Blasting vibrations: - Optimise shothole geometry; - Alter time and frequency of blasting; - Restrict maximum instantaneous charge detonated; - Consider ripping in softer formations.	Mine Manager	Prior to blasting Prior to blasting Prior to blasting Ongoing Ongoing

6.4.9 Traffic

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
An increase in traffic volumes will result in an impact on congestion, safety, road damage, erosion and dust.	General	Overall Management Objective	• Manage the increase in traffic in terms of congestion, road surface damage, safety concerns, dust and erosion.	Engineering Manager	Ongoing
	Construction and Operation	Mitigatory Measures	• All vehicular traffic on site should adhere to mine road safety measures. • All mine vehicles should be road worthy. • Only designated roads should be used for mining vehicles. • Ensure drivers and operators of equipment are familiar with the safety policies and regulations.	Engineering Manager	Ongoing

Refer to Soils for mitigatory measures related to soil erosion

Refer to Air Quality for mitigatory measures related to dust control

6.4.10 Radiation

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Contamination of machinery by radioactive isotopes and therefore a potential impact on workers and the environment	Operation, Decommissioning & Closure	Overall Management Commitment	Ensure compliance to the National Nuclear Regulator Act, 1999 (Act 47 of 1999)	Instrumentation Superintendent	Annually
	Decommissioning & Closure	Commitment	Ensure that upon decommissioning all equipment and machinery is radiation free.	Instrumentation Superintendent	Upon decommissioning
		Mitigatory Measure	Any contaminated equipment to be disposed of at a suitably registered facility (safe disposal certificate).	Instrumentation Superintendent	Upon decommissioning

6.4.11 Heritage Resources

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Impacts include a destruction or disturbance of cultural and natural heritage resources due to construction and mining operations	General	General Management Commitments	Avoid impacts on cultural and natural heritage sites.	Mine Manager	Ongoing
	Construction, Operation and Decommissioning	Mitigatory measures relating to cultural heritage resources	**General:** • Undertake a Heritage Resources Management Programme. • Ensure the awareness of staff and contractors on the importance of protecting natural and cultural heritage resources. • Should any graves, archaeological or palaeontological objects or material be exposed during excavation, work on the area where the graves, objects or material were found, shall cease immediately and the mines appointed responsible person shall be notified as soon as possible. Upon receipt of such notification, the mines appointed responsible person will immediately report the find to the responsible heritage resources authority (SAHRA).	Mine Manager Mine Manager Mine Manager	End of 2005 Ongoing When applicable

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
			Archaeological and palaeontological sites: • Existing archaeological and palaeontological sites will be fenced off where necessary and no mining will take place in their immediate vicinity where possible. • Under no circumstances shall archaeological or palaeontological objects or material be destroyed, damaged, excavated, altered, defaced or otherwise disturbed without the necessary permits. • The mine shall advise its workers of the penalties associated with the unlawful removal of archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act, 1999 (Act 25 of 1999) section 51. **Burial grounds and graves:** • Existing burial grounds and graves will be fenced off, where necessary, and no mining will take place in their immediate vicinity. • Should any grave/s need to be moved in the near future, due to the expansion of mining, permissions to exhume and re-bury the human remains and associated grave dressings and cultural remains will be obtained from: - South African Heritage Resources Agency (SAHRA); - The South African Police Services at Mooinooi; and the - Department of Home Affairs.	Mine Manager	Ongoing

Refer to Sensitive landscapes for mitigatory measures relating to natural heritage resources

6.4.12 Sensitive Landscapes

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Destruction / Loss of Sensitive Landscapes	General	Overall Management Commitment	As far as possible, mining and mining related activities will not impact on sensitive environments.	Mine Manager	Ongoing
	Construction and Operation	Mitigatory Measures	• Ensure that any new mining or mining related activities remain outside the 1:50 year floodline unless the necessary authorisations have been obtained. • Limit construction activities to demarcated areas. • Implement training and awareness programmes to all staff/ contractors regarding the importance and protection of sensitive environments. • Undertake a Heritage Resources Management Programme for the identification of natural heritage resources.	Engineering Manager	Ongoing

Refer to the following sections for further mitigatory measures relating to sensitive environments: Water Resources, Biodiversity and Heritage Resources

6.4.13 Visual Aspects

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
	General	Overall Management Commitment	• Minimise the aesthetic impact of intrusive mining infrastructure. • Minimise the scarring of soil surface and land features.	Engineering Manager	Ongoing
	Construction and Operation	Mitigatory Measures	• Minimise the impact, of illumination of the mine, on adjacent land owners by ensuring that lighting is focused on the necessary mining areas.	Engineering Manager	Ongoing
	Decommissioning and Closure	Mitigatory Measures	• The waste rock dumps will be reclaimed, used for building aggregate or re-habilitated. • Infrastructure to remain post-closure will be determined through consultation with stakeholders, the rest will be demolished and the areas rehabilitated. • The slopes of all the Tailings Facilities are to be re-vegetated to blend in with the natural environment and should reflect the natural form of the landscape as far as practically possible.	Engineering Manager	Ongoing

6.4.14 Socio-economic Aspects

IMPACT	DEVELOPMENT PHASE	COMMITMENTS/OBJECTIVES/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Mining and mining related activities impact on the socio-economic aspects of the area in the following ways: • Employment opportunities • Education and skills development • Corporate social investment • Primary health care • Formal accommodation • Increase in the influx of job seekers to the local and surrounding areas • Increased crime levels • Informal housing settlements • Pollution • Environmental degradation • Potential spread of communicable diseases	General	Commitment	Full compliance with the Broad-based Socio-Economic Empowerment Charter for the South African Mining Industry.	Vice President of Human Capital.	Ongoing
	Construction and Operation	Objectives	**Community based objectives:** • Enhance the community skills base through the building of facilities and the training and development of stakeholders. • Enhance the economic base of the community and to increase employment opportunities. • Promote community projects to enhance the environment and control degradation. • Maximize the relationships between Lonmin Platinum and the community to enhance joint development and cooperation. • Create an environment conducive for opportunities for Small, Medium Micro Enterprises (SMME's).	Vice President of Human Capital.	Ongoing
			• Assess the impacts that Lonmin Platinum has had on the region and its local communities.	Vice President of Human Capital.	End of 2005

IMPACT	DEVELOPMENT PHASE	COMMITMENTS/OBJECTIVES/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
			Employee based objectives: • Teach all employees to be conversant in English and improve the literacy rate and qualifications of all personnel. • Increase study grant opportunities to HDSA and women in order to increase appointments in mining positions. • Align all study grant opportunities to equity targets and formal education requirements. • Delivering access to formal housing for all employees by 2009 • Facilitate the successful incorporation of HDSA's into the organisation through the existing mentorship scheme.	Vice President of Human Capital.	Ongoing
Loss of employment due to closure	Decommissioning and Closure	General Management Commitments	• Consideration will be given to measures that will reduce retrenched employees difficulties in finding work elsewhere and consequent unemployment for long periods. • Ensure that skills transfer programmes are successful throughout the operational life of the mine. • Ensure that the closure objectives are incorporated into the Social & Labour Plan.	Vice President of Human Capital.	When applicable

6.4.15 Interested & Affected Parties

IMPACT	DEVELOPMENT PHASE	OBJECTIVES/ COMMITMENTS/ MITIGATORY MEASURES		ACCOUNTABILITY	TIMING
Negative: Inadequate public consultation process and potentially dissatisfied I&APs Positive: Satisfied and informed I&APs	General	General Management Objectives	• Manage development in an environmentally sustainable and transparent manner and ensure that all development complies with current legislation. • Maintain open communication channels and transparency between the mine and the I&AP's. • Avoid or minimise potential negative environmental, health, safety, social or economic impacts on I&AP's.	Mine Manager and Group Manager Communications	Ongoing
	Prior to Construction	Mitigatory Measures	For all new activities or developments listed according to DME, DACET or DWAF regulations, I&APs shall be consulted through the public participation methods described in detail in Section 2.	Mine Manager and the Lonmin Environmental Centre	Prior to construction
	All Phases	Mitigatory Measures	• A data base of all I&APs for EPM and EPM Opencast will be kept up to date and easily accessible. • I&APs will be given the opportunity to raise any comments or concerns regarding mining and mining related activities, through various public participation channels as detailed in Section 2. • All complaints and non-conformances will be managed by the ISO14001 management system. • The records of complaints and non-conformances will be used as a tool for continual improvement by the mine.	Mine Manager and Group Manager Communications	Ongoing When applicable Ongoing Ongoing

The impact of mining and mining related activities on the environment impacts directly on the I&AP's, therefore refer to all other sections for mitigatory measures relating to the I&AP's

6.5 Monitoring and Performance Assessment

The monitoring and reporting period for the various environmental aspects discussed in the EMPR are indicated in **Table 6.5(a)** together with the responsible government department to whom the reports are submitted.

Table 6.5(a) Monitoring at EPM

IMPACTS	MONITORING PERIOD	REPORTING PERIOD	RESPONSIBLE GOVERNMENT DEPARTMENT
Topography	Ongoing	Adhoc*	DME/DEAT
Soils	Ongoing	Adhoc*	DME/DEAT
Land capability	Ongoing	Adhoc*	DME/DEAT
Natural vegetation	Ongoing	Adhoc*	DME/DEAT
Animal life	Ongoing	Adhoc*	DME/DEAT
Water quality & quantity			
Surface water	Monthly	Annually	DWAF
Ground water	Quarterly	Annually	DWAF
Storm water	Ad hoc	Annually	DWAF
Air quality			
Dust fallout	Continuous	Annually	CAPCO&DACE
Noise			
Within EPM (occupational)	Quarterly	Quarterly	DME
Outside EPM plant (boundary)	Quarterly	Reported internally	N/A
Visual aspects	Ongoing	Only if significant impact is proposed, in which case an EIA will be completed	DME
Archaeological, historical and cultural sites	Ongoing	Adhoc*	SAHRA & DME (for comment)
Socio-economic	Refer to Social & Labour Plan		
Sensitive landscapes	Ongoing	Only if significant impact is proposed, in which case an EIA will be completed	DME/DEAT
I&AP's			
Maintain a public complaints record	Continuous	Internal	
Open days	Annual	Annual	Minutes sent to all attendees (including government departments)

IMPACTS	MONITORING PERIOD	REPORTING PERIOD	RESPONSIBLE GOVERNMENT DEPARTMENT
Additional Community Forum Meetings	Adhoc	Adhoc	Minutes sent to all attendees
Safety Risks and Hazards	Ongoing	When required	DME