APPENDIX 9: DRAFT ENVIRONMENTAL MANAGEMENT PLAN

DRAFT ENVIRONMENTAL PLAN:

PROPOSED CHROME CHEMICALS PLANT, MIDDELBURG

FOR:
SAMANCOR CHROME (PTY) LTD

MARCH 2008

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DRAFT ENVIRONMENTAL MANAGEMENT PLAN
FOR
PROPOSED CHROME CHEMICALS PLANT, MIDDELBURG

PREPARED FOR SUBMISSION TO:

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Refer to Appendix 10: Company Profiles and CV's for further information.

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ABBREVIATIONS

DWAF Department of Water Affairs & Forestry
DEAT Department of Environmental Affairs & Tourism
EA Environmental Authorisation
EMP Environmental Management Plan

1 INTRODUCTION

1.1 BACKGROUND

The process of assessing environmental impacts as part of an EIA includes the identification of specific measures that can be implemented to avoid, reduce, or mitigate the significance of potential impacts to an acceptable level. To ensure that an EIA and its conclusions and recommendations remain valid throughout a project's life-cycle, some procedure or measure is required to give practical effect to these mitigation measures.

The purpose of this report is to provide the project proponent, Samancor Chrome with practical management options that will ensure that the impacts of the proposed chrome chemicals manufacturing plant are adequately managed, and to denote key responsibilities. This report, therefore, acts as a stand-alone document, which can be used on the site during the various phases of the development. The EMP has been developed with a focuses on being pro-active by addressing potential problems before they occur wherever possible from project initiation to closure. The EMP may become legally binding on Samancor Chrome through condition/s of authorisation, and should accordingly also be made binding (contractually) on all contractors related to the project.

1.2 EMP STRUCTURE

In order to realise the objectives of the EMP, the document:

- Specifies the general roles and responsibilities for the implementation and monitoring of the EMP;
- Identifies the specific aspects (i.e. activities related to the development) that may result in environmental impacts and therefore require management/mitigation;
- Identifies the specific impacts or risks that may eventuate during the construction or operational phases of the project;
- Determines and specifies the specific mitigation measures that must be implemented;
- Identifies the related monitoring procedures;
- Specifies the responsible party for implementation of specific measures and monitoring procedures; and
- Determines the frequency of implementing measures and monitoring procedures.

1.3 EMP IMPLEMENTATION

The EMP should not be seen as an additional requirement separate from the day-to-day activities of the site. If it becomes merely another layer of control, it could be perceived as an obstruction to normal duties and operations. The EMP must be integrated with and form part of routine operations and responsibilities, which requires commitment from management and the workforce alike (DEAT, 2004).

1.4 EMP UPDATE

This EMP must be updated upon:

- o receipt of an EA,
- o completion of the final detailed plant design, and/or
- o issues of any relevant environmental permit, licence, or authorisation

2 ROLES & RESPONSIBILITIES

2.1 THE PROJECT PROPONENT/DEVEOPER (SAMANCOR CHROME)

Samancor Chrome will be responsible for the overall implementation, monitoring and enforcement of the activities as outlined by the EMP. The project manager or other senior designate from Samancor Chrome will be responsible for overseeing that environmental compliance and monitoring is performed, and will undertake all correspondence with the relevant authorities.

Samancor Chrome remains ultimately responsible for ensuring that the development is implemented according to the provisions of the EMP and Environmental Authorisation (EA) throughout all phases of the project. Although specific role-players will be appointed by Samancor Chrome to perform certain functions on its behalf, the ultimate responsibility is not delegated. Samancor Chrome has to ensure that sufficient resources (time, financial, human, equipment, etc.) are available to the other parties to efficiently perform their tasks in terms of the EMP. As Samancor Chrome is liable for restoring negligent damage caused to the environment[1], each member of staff has to be responsible and accountable for compliance as per the EMP.

2.2 PROJECT/SITE MANAGER (PSM)

Samancor Chrome must appoint/designate a senior representative or Project/Site Manager (PSM) to act on its behalf. The duties of this representative would include:

- Ensure that the EMP is part of relevant contractual documentation so that contractors are bound to the conditions of the EMP and EA;
- Monitor the undertaking of Samancor Chrome on environmental awareness training for all new personnel coming onto site, or undertake environmental awareness courses themselves;
- Appoint an Internal Environmental Officer (IEO) to assist with day-to-day EMP implementation and monitoring duties;
- During the construction phase the IEO must oversee all the environmental aspects relating to the development and provide independent auditing of compliance with the EMP;
- Ensure that the necessary environmental authorisations and permits have been obtained and are maintained;
- Comply with the contents of the EMP to ensure that the requirements of the EMP are met;
- Monitor and verify that the EMP is adhered to at all times and take action if the specifications are not followed;
- Monitor and verify that environmental impacts are kept to a minimum;
- Review operational Method Statements in conjunction with the IEO;
- Assist the IEO in finding environmentally responsible solutions to problems;
- Inspect the site and surrounding areas from time to time; and
- Monitor, review and verify compliance with the EMP as reported by the IEO.

[1] In this respect see section 34 (Criminal Proceedings) of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

2.3 INTERNAL ENVIRONMENTAL OFFICER (IEO)

Samancor Chrome's Internal Environmental Officer (IEO) will be responsible for monitoring, reviewing and verifying compliance with the EMP on a day-to-day basis. This role may be fulfilled by any suitably qualified and responsible representative involved with daily on-site operations. In particular, the IEO shall:

- Regularly inspect and continuously monitor the site to ascertain the level of compliance with the EMP;
- Maintain inspection reports on file;
- Monitor and verify (audit) that the EMP is adhered to at all times and take action if the specifications are not followed;
- Monitor and verify that environmental impacts are kept to a minimum;
- Assist Samancor Chrome in finding environmentally responsible solutions to problems;
- Keep records of all activities/incidents concerning environment performance;
- Keep a register of complaints;
- Provide material/manuals and support for raising environmental awareness of staff;
- Ensure that activities on site comply with legislation of relevance to the environment;
- Complete checklists as necessary; and
- Continually, internally review the EMP and submit monthly reports to the PM.

2.4 ENVIRONMENTAL CONTROL OFFICER (ECO)

It is recommended that an independent Environmental Control Officer (ECO) be appointed by Samancor Chrome to oversee all the environmental aspects relating to this development. The ECO should be appointed prior to the construction phase. He/she should attend all project meetings, conduct audits to assess compliance with the EMP and be responsible for providing feedback on potential environmental problems associated with the activities on site. The ECO will:

- Assist the IEO in ensuring that necessary environmental authorisations and permits have been obtained;
- Undertaking routine monitoring and appointing a competent person/ institution to be responsible for specialist monitoring, if necessary;
- Undertake independent audits with regards to compliance with the EMP;
- Compile audit reports identifying areas of non-compliance and proposals for rectification thereof; and
- Assist Samancor Chrome in achieving first-rate environmental management practices.
- Liaise with relevant authorities; and
- Liaise with contractors regarding environmental management.

a) Liaison with Authorities

The ECO would be responsible for liasing with MDALA. During the construction phase, the ECO would be responsible for submitting periodic (as determined by the department) Environmental Audit Reports on the development to the Department. These audit reports will be based on the mitigating measures recommended and will include a description of the general state of the site, with specific reference to sensitive areas and areas of non-compliance. A record of all audits and communications with

the authority must be kept by the ECO.

b) Liaison with Contractors

The ECO will be responsible for informing the contractors of any decisions that are taken concerning the natural and social environment during the construction phase of the development. This would also include informing the contractors of the necessary corrective actions to be taken against employees transgressing the management activities stipulated in this EMP.

3 ENVIRONMENTAL MANAGEMENT PLAN

ENVIRONMENTAL MANAGEMENT PLAN (EMP) – SAMANCOR CHROME ENERGY (PTY) LTD. ANAEROBIC DIGESTER & BIOGAS RECOVERY PROJECT				
ASPECT	**ACTIVITY**	**MANAGEMENT ACTIONS & MONITORING**	**RESPONSIBILITY**	**FREQUENCY & DATE**
1. PROJECT PLANNING & DESIGN PHASE				
Management (Set-up structures and procedures for implementation of EMP)	Appointment of and duties of IEO	Appoint an Internal Environmental Liaison Officer (IEO) who will be required to monitor the site with a direct hands-on approach and ensure compliance and co-operation of all personnel.	PSM	Once-off, Before Construction Begins
	Update the EMP after detailed design has been completed	This EMP must be updated to ensure that it is relevant to the detailed design of the plant and operation.	IEO, PSM. Design Engineer	Once-off, Before Construction Begins
	Update the EMP to reflect the requirements of the Environmental Authorisation	This EMP must be updated to ensure that all conditions of the Environmental Authorisation issued for this project have been incorporated into the EMP.	IEO	Once-off, Before Construction Begins
		This EMP must be updated to ensure that all conditions of the any instrument of environmental legislation (e.g. permits, licenses etc) issued for this project have been incorporated into the EMP.	IEO	Before commencement of the affected activity
	Appointment and duties of ECO	The developer must appoint an independent Environmental Control Officer (ECO) who must monitor the contractor's compliance with the EMP.	IEO	Once-off, Before Construction Begins
		The priority of the ECO is to maintain the integrity of the development conditions outlined in the EMP.	ECO	Continuous
		The ECO should form part of the project management team and should attend all project meetings or as requested.	ECO	Continuous
		The contractor must ensure that the construction crew attend an environmental briefing and training session presented by the ECO prior to commencing of site activities.	ECO, Contractor	Once-off

ENVIRONMENTAL MANAGEMENT PLAN (EMP) – SAMANCOR CHROME ENERGY (PTY) LTD. ANAEROBIC DIGESTER & BIOGAS RECOVERY PROJECT				
ASPECT	**ACTIVITY**	**MANAGEMENT ACTIONS & MONITORING**	**RESPONSIBILITY**	**FREQUENCY & DATE**
	Management of contractors	The EMP must be made binding to the main contractor as well as individual contractors and should be included in tender documentation for the construction contract.	PSM	Once-off, before contractor appointment
		EMP must be made available to the main contractor as well as individual contractors, as well as other relevant role-players.	PSM, ECO	Once-off, upon appointment of contractor
Training	Training of Staff and Contractors	Contractors and staff must be properly trained in all environmental aspects relating to their role in the project's construction and operation.	PSM, Contractor, ECO	Once-off & before contractor commences activities
Legal Compliance	Handling, Treatment and Temporary Storage of Waste	Obtain waste disposal permit in terms of section 20 of the Environment Conservation Act, 1989 (Act No. 73 of 1989), for the accumulation, handling, and treatment of process residue.	PSM	Once-off, Before construction commences
	Emissions to Air	Apply for an Atmospheric Emission Licence (AEL) in terms of the National Environment Management: Air Quality Act, Act No. 39 Of 2004, from the Department of Environmental Affairs & Tourism. If the department or designated authority has not begun to consider applications for AELs at this time, then apply for a registration certificate in terms of the Atmospheric Pollution Prevention Act, No. 45 of 1965 for process No. 50 Chromium processes as per the second schedule to the act.	PSM	Once-off, Before construction commences
	Prevention, abatement and mitigation strategies for Emissions to Air	Equipment design must be reviewed and adjusted to ensure that the requirements of the AEL or APPA registration certificate (whichever is applicable) are met.	PSM, Design Engineer	
	Major Hazardous Installation	Register the proposed development with the Department of Labour as per the requirements of the Occupational Health and Safety Amendment Act, Act No. 181 of 1993, and the associated Major Hazardous Installation Regulations.	PSM	Once-off, Before construction commences
	Water Use	Apply for an integrated water use permit in terms of the National Water Act, Act No. 36 of 1998.	PSM	Once-off, Before construction commences

ENVIRONMENTAL MANAGEMENT PLAN (EMP) – SAMANCOR CHROME ENERGY (PTY) LTD. ANAEROBIC DIGESTER & BIOGAS RECOVERY PROJECT				
ASPECT	**ACTIVITY**	**MANAGEMENT ACTIONS & MONITORING**	**RESPONSIBILITY**	**FREQUENCY & DATE**
Project programme & Construction planning	Construction Timing	If possible, schedule construction activities for the dry winter months to decrease the risk of erosion during heavy thunderstorms. Reduce earthworks etc. during rainy season (November to March).	PSM, Contractor	As possible
	Containment of run-off	The plant surface flooring should be impermeable and be designed to ensure that all potentially contaminated run-off and spills are captured and channelled to lined catchment dams. The dams must have capacity sufficient to contain run-off from a 1 in 100 year rainfall event. There must be leak detection system that will facilitate the identification of any breach of the impermeable surface.	Design Engineer	Once-off, Before construction
	Protection of surface water systems on south end of site	The water course/wetland at the south end of the site must be delineated and the plant must be positioned such that it will remain clear of the watercourse/wetland at the southern end of the site.	PSM, Design Engineer	Once-off, Before construction
	Protection of the Vaalbank Spruit	The area to be disturbed during the construction phase must be determined and measures incorporated in the project design to ensure that the banks of the vaalbank spruit are not damaged during construction. Drainage channels with silt traps must be designed to ensure that silted run-off does not flow into the spruit.	PSM, Design Engineer	Once-off, Before construction
	Services	Estimate, and obtain upfront confirmation of, required services and the availability thereof (e.g. sewage, water, waste disposal). Ablution facilities must be supplied for site personnel and any effluent and waste from these facilities must be disposed of to an appropriate municipal sewerage system or approved treatment plant.	PSM, Contractor	Once-off
Mitigation recommendations and commitments as per the EIA, and conditions any other environmental authorisations/licences/ permits	Abatement of atmospheric emissions	Ababtement equipment must be designed to ensure that the emissions levels as contemplated in the EIA and as required by the AEL are met	PSM, Design Engineer	Once-off, Before construction
	Waste handling and storage	Facilities for the storage and hazardous waste must be incorporated into the project design to ensure that all hazardous waste will be handled and stored in compliance with Section 10 of the Department of Water Affairs & Forestry Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste.	PSM, Design Engineer	Once-off, Before construction
	Any other conditions	All relevant management and mitigation required by the Environmental Authorisation and any other environmental authorisations or licences or permits, must be incorporated into the project design	PSM, Design Engineer	Before construction of the affected activity (where practical)

ASPECT	POTENTIAL IMPACT/RISK/ISSUE	MANAGEMENT ACTIONS & MONITORING	RESPONSIBILITY	FREQUENCY & DATE
2. CONSTRUCTION PHASE				
Monitoring and Reporting	Compliance with the EMP and Environmental Authorisation.	Monitor site activities and compliance with EMP.	IEO	Continuous
		Identify, propose, monitor and sign off on the implementation of rectification measures.	IEO, PSM	Continuous
		Audit compliance with EMP and report to authorities.	ECO	As determined by the relevant authorities
Environmental incidents	Environmental incident during the construction phase	MDALA must immediately be informed should any serious incident occur which is likely to have detrimental effects on the environment. A record of these incidents must be kept.	PSM	As required
		Samancor Chrome will be responsible for rehabilitating any damaged caused to the environment due to any event occurring on site.	PSM	As required
Construction site management	Construction hazards	Construction activities must be planned and undertaken in compliance with the Occupational Health and Safety Amendment Act, Act No. 181 of 1993, and the regulations thereunder, including but not necessarily limited to: General Safety Regulations, 1986, Construction Regulations, 2003; and, the National Building Regulations and Building Standards Act, 1977 (Act No.103 of 1977) and regulations thereunder.	PSM, Contractors	Continuous
	Hygiene	If the construction crew is accommodated on site, it must be according to the local authority's by-laws.	Contractor	Once-off
		Provide contractors cooking and ablution facilities on the site and remove these facilities only after completion of all construction works.	Contractor	Once-off
		The toilets must be emptied and maintained in a working order throughout the construction period.	Contractor, ECO, IEO	Daily
		These facilities should be located in the higher lying area of the site.	Contractor, ECO	Once-off
		Litter generated by the construction crew must be collected in suitable receptacles and disposed of at least weekly at registered disposal sites.	Contractor, ECO	Daily
	Risk of fires	No fires are to be allowed on site to prevent veld fires.	Contractor	Continuous
		Welding, gas cutting or cutting of metal will only be permitted inside the working areas.	Contractor	Continuous
		The Contractor shall pay the costs incurred to organisations called to put out any fires started by him. The Contractor shall also pay any costs incurred to reinstate burnt areas as deemed necessary by the ECO/IEO.	Contractor	Continuous
Construction activities (operations, earth-	Surface water and soil contamination	Vegetation clearance must be kept to a minimum and impacted areas must be re-vegetated as soon as is practically possible.	Contractor	Once-off

ASPECT	POTENTIAL IMPACT/RISK/ISSUE	MANAGEMENT ACTIONS & MONITORING	RESPONSIBILITY	FREQUENCY & DATE
2. CONSTRUCTION PHASE				
moving, excavation, etc.)		Ensure that excavated and stockpiled soil material is stored and bermed on the higher lying areas of the site and not in any stormwater run-off channels or any other areas where it is likely to cause erosion or where water would naturally accumulate.	Contractor, IEO	Daily
		Provision must be made for sanitation and potable water for the construction workers and chemical toilets on site must be emptied weekly.	Contractor, IEO	Daily, weekly
		Uncontaminated water draining from the site must be de-silted before it is discharged to natural water systems.		
		Care must be taken to ensure that no contaminated water from the construction site enters the the natural watercourses.	Contractor, IEO	As required
	Soil integrity and erosion	The Contractor shall take appropriate and active measures to prevent erosion resulting from his own works	Contractor	As required
		the Contractor shall protect areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas. These drainage facilities must have silt traps to prevent silt from entering natural water systems.	Contractor	As required
		Top-soil material must be separately stockpiled for later use in rehabilitating damaged areas or for landscaping purposes.	Contractor, IEO	As required
	Atmospheric pollution and odours	Cover materials such as sand during transport to and from the site with tarpaulin.	Contractor, ECO	As necessary
		Ensure that no wastes are burnt on the premises or on surrounding premises.	Contractor, ECO	Daily
		The Contractor is to take appropriate measures to minimise the generation of dust as a result of construction works, to the satisfaction of the ECO. On sandy or very dusty sites, mulched indigenous vegetation which is to be removed from the site and is suitable, can be used as a method of stabilisation and dust control on any cleared or exposed sections of the site. Alternatively, straw stabilisation or watering can be used. Seed bearing invasive vegetation must not be used for this purpose.	Contractor, ECO	As necessary
Construction activities (operations, earth-moving, excavation, etc.)	Destruction of flora	Areas of the natural vegetation that is to be conserved must be demarcated during construction. The boundary of the watercourse/wetland on the southern end of the site must be demarcated, and must not be crossed during the undertaking of construction activities.	Contractor, IEO	Once off, inspect daily

ASPECT	POTENTIAL IMPACT/RISK/ISSUE	MANAGEMENT ACTIONS & MONITORING	RESPONSIBILITY	FREQUENCY & DATE
2. CONSTRUCTION PHASE				
		No fires may be ignited with the intent to destroy the flora on site and surrounding properties.	Contractor, IEO	Continuous, inspect daily
		Any indigenous vegetation damaged or removed unnecessarily must be replaced with the same species and size; the onus will lie with the contractor for the maintenance of the replaced vegetation until it has become established.	Contractor, IEO	As necessary
	Destruction of heritage resources	Construction personnel must be alert and must inform the local authority should they come across potentially valuable findings.	Contractor	As necessary
		Any archaeological sites exposed during construction activities may not be disturbed prior to authorisation by the South African Heritage Resources Agency	Contractor	As necessary
	Displacement of fauna	Construction workers may under no circumstances interfere with the fauna for the purposes of obtaining food.	Contractor, IEO	Once off, inspect daily
Waste Management	Land and water pollution	The Contractor shall be responsible for the establishment of a refuse control system that is acceptable to the ECO. For the purposes of this document refuse includes discarded construction materials such as steel reinforcing, wooden shuttering and timbers, cement bags, piping etc.	Contractor, IEO	Continuous, inspect daily
		The Contractor shall ensure that waste and surplus food, food packaging and organic waste are not deposited by his employees anywhere on the site except in refuse bins for removal on a daily basis by the Contractor. Refuse bins shall be weather and animal-proof.	Contractor, IEO	Continuous, inspect daily
		The Contractor must transport refuse collected from the working areas from site at least once a week. Refuse must be disposed of at a site approved by the ECO.	Contractor, IEO	Continuous, inspect daily
		Ensure that no refuse or builders rubble generated on the premises be placed, dumped or deposited on adjacent/surrounding properties including road verges, roads or public places and open spaces during or after the construction period of the new development.	Contractor, IEO	Continuous, inspect daily
Vehicles and Fuel Storage	Vehicles and Fuel Storage	Fuels and flammable materials are to be stored in suitably equipped storage areas complying with general fire safety requirements. No fuel may be stored within the 1: 50 year flood line level. Impervious materials are to be used in these storage areas to prevent contamination of the ground in the event of spillages or leaks.	Contractor, IEO	Once-off & inspect daily
		All vehicles, equipment, fuel and petroleum services and tanks must be maintained in a good condition that prevents leakage and possible contamination of soil or water supplies. Refuelling areas should be bunded.	Contractor, IEO	Once-off & inspect daily

ASPECT	POTENTIAL IMPACT/RISK/ISSUE	MANAGEMENT ACTIONS & MONITORING	RESPONSIBILITY	FREQUENCY & DATE
2. CONSTRUCTION PHASE				
		All servicing must have a drip tray present to prevent accidental spillage of oils and fuels.	Contractor, IEO	Once-off & inspect daily
		A suitable leak proof container for the storage of oiled equipment (filters, drip tray contents and oil changes etc.) must be established.	Contractor, IEO	Once-off & inspect daily
Preparation of Building Material & Cement works	Preparation of Building Material & Cement works	Where possible building materials are to be prepared at the batching plant, to enable the effects of cement and other substances, and the resulting effluent to be more easily managed.	Contractor, IEO	Once-off & inspect daily
		All cement effluent from mixer washings, and run-off from batching areas and other work areas shall be contained in suitable sedimentation ponds. Sedimentation ponds shall be allowed to dry out on a regular basis to allow for solid material to be removed. This material must be disposed of in a suitable manner, depending on the nature of the material, and to the discretion of the IEO, in consultation with the local authority.	Contractor, IEO	Once-off & inspect daily
		Cement contaminated water may not enter a natural or man-made water system. Preventative measures include establishing sumps from where contaminated water can be either treated in situ or removed to an appropriate waste site. If possible/appropriate ready mix concrete should be used.	Contractor, IEO	Once-off & inspect daily
		Cement bags are to be stored securely out of harms way from the elements (wind and rain). Excess or spilled concrete should be confined within the works area and then removed to a waste site.	Contractor, IEO	Once-off & inspect daily
Site Clean Up and Rehabilitation	Post construction activities	The Contractor must ensure that all structures, equipment, materials and facilities used or created on site for or during construction activities are removed once the project has been completed. The construction site shall be cleared, and cleaned to the satisfaction of the ECO.	Contractor, PSM, IEO, ECO	Once-off at end of construction

ASPECT	POTENTIAL IMPACT/RISK/ISSUE	MANAGEMENT ACTIONS & MONITORING	RESPONSIBILITY	FREQUENCY & DATE
3. OPERATIONAL PHASE				
Legal Compliance	Identification of environmental legal requirements	Procedures must be drawn up to ensure that all relevant environmental legal requirements and amendments are identified, and that this EMP can be updated to ensure that those legal requirements are met.	PSM	Continuous
	Updating the EMP	The EMP must be updated on a periodic basis to ensure that environmental legal requirements for the chrome chemicals operation are adhered to.	PSM	At least once per calendar year
Monitoring and Reporting	Compliance with the EMP and Environmental Authorisation.	Monitor site activities and compliance with EMP.	IEO	Continuous
		Identify, propose, monitor and sign off on the implementation of rectification measures.	IEO, PSM	Continuous
		Audit compliance with EMP and report to authorities.	ECO	Bi-annually
Environmental incidents	Any environmental incidents occurring during the operational phase	MDALA must immediately be informed should any serious incident occur which is likely to have detrimental effects on the environment. A record of these incidents must be kept. All incidents must be reported as per the requirements of S30 of the National Environmental Management Act, No. 107 OF 1998. "Incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed;	PSM	As soon as reasonably practicable after obtaining knowledge of the incident, Preferably within 24 hours.
		Samancor Chrome will be responsible for rehabilitating any damaged caused to the environment due to any event occurring on site.	PSM	As required
Emergencies procedures		A protocol for response during emergencies must be developed and maintained.	PSM	Once-off & updated as required
		An on-site safety plan must be available and all staff must be trained in the appropriate emergency procedures.	PSM, IEO	Once-off & updated as required
		Ensure that the contact details of the police or security company, ambulance service and fire brigade are available on site.	IEO	Once-off & updated as required
Containment of run-off and spills	Possible spillage and water pollution due to paving and/or liner failure	Leak detection system must be inspected daily to ensure there are no leaks in the impermeable paving.	IEO	Daily
		In the event that a leak is detected, the source of the leak must be identified and temporary sealant/isolation installed to prevent further leakage until the breach is permanently repaired.	IEO	When a leak is detected
		Leaks must be reported to the maintenance engineer, and must be repaired.		Within 2 weeks of leak identification.

ASPECT	POTENTIAL IMPACT/RISK/ISSUE	MANAGEMENT ACTIONS & MONITORING	RESPONSIBILITY	FREQUENCY & DATE
3. OPERATIONAL PHASE				
		If a run-off containment facility is breached, and contaminated water leaves the containment facilities, the event must be recorded as an emergency incident and must be reported to the Department of Water Affairs & Forestry, the local catchment management agency and the police or firebrigade as required in S20(3) of the National Water Act, Act No. 36 of 1998. The matter must also be reported to the Mpumalanga Department of Agriculture and Land Administration.		As soon as reasonably practicable after obtaining knowledge of the incident, Preferably within 24 hours.
		Two monitoring boreholes to be established upstream, and four downstream of the site for the purpose of groundwater monitoring. This will ensure that any infiltration of contaminated surface run-off is identified.	IEO	Once off, Before commencement of operation. Also see monitoring plan.
		If monitoring boreholes indicate infiltration of contaminated run-off to groundwater, the source must be investigated and rectified. The event must be recorded as an emergency incident and must be reported to the Department of Water Affairs & Forestry, the local catchment management agency and the police or firebrigade as required in S20(3) of the National Water Act, Act No. 36 of 1998. The matter must also be reported to the Mpumalanga Department of Agriculture and Land Administration.	IEO	As soon as reasonably practicable after obtaining knowledge of the incident, Preferably within 24 hours.
Emissions to atmosphere	Prevention and mitigation strategies and Abatement equipment	Prevention and mitigation strategies and Abatement equipment must be instituted as per the project design to meet the requirements of the Atmospheric Emissions Licence (or APPA registration certificate) and the Environmental Authorisation.	PSM, Design Engineer	Before commencement of operation
	Emission source monitoring	Emissions from all point sources must be measured as per the monitoring plan to demonstrate compliance with the Atmospheric Emissions Licence (or APPA registration certificate) and the Environmental Authorisation.	IEO	See Monitoring plan
	Ambient monitoring	Ambient monitoring must be undertaken to demonstrate compliance with the Atmospheric Emissions Licence (or APPA registration certificate) and the Environmental Authorisation, and duty of care in terms of S28 of the National Environmental Management Act, No. 107 OF 1998.	IEO	See Monitoring plan
	Emission management procedures	Emissions management procedures must be formulated to ensure that the above requirements for waste management are implemented.	IEO	before commencement of operation

ASPECT	POTENTIAL IMPACT/RISK/ISSUE	MANAGEMENT ACTIONS & MONITORING	RESPONSIBILITY	FREQUENCY & DATE
3. OPERATIONAL PHASE				
	Review of emissions management procedures	Emissions management procedures must be reviewed and upgraded periodically to ensure that any amnedmants to relevant environmental law, permits, licences, or other relevant authorisations are identified and implemented appropriately.	IEO	At least once per annum
Waste Management	Treatment of process residue containing hexavalent chromium	All process residues containing hexavalent chrome must be treated to reduce the hexavalent chromium, such the concentration of hexavalent chromium in the residue to be disposed is below the acceptable risk limit (as contemplated in the Department of Water Affairs & Forestry Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste) for hexavalent chromium.	IEO	Continuous, before disposal
	Classification and Hazard rating of wastes	An inventory of waste streams must be formulated, and all waste streams must be classified and hazard rated as per the DWAF Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste.	IEO	Within 3 months of commencement of operation
	Storage, handling and transportation of hazardous waste	All wastes must stored, handled and transported in accordance with the DWAF Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste (in particular Section 10 Waste Handling, Storage And Transportation). A hazardous waste management procedure must be developed and implemented to ensure compliance with the above.	IEO	Continuous
	Disposal of hazardous waste	Hazardous wastes must only be disposed of at appropriate permitted disposal sites. Manifests must be created and maintained for all hazardous waste disposed.	IEO	Continuous
	Recyclable waste	An inventory of recyclable waste must be formulated. These waste streams must be recovered, recycled, and/or reused as far as is practically possible.	IEO	Continuous, Within 3 months of commencement of operation
	Non Recyclable General Waste	Non Recyclable General Waste must be disposed of at a permitted disposal site	IEO	Continuous, Within 3 months of commencement of operation
	Waste management procedures	Waste management procedures must be formulated to ensure that the above requirements for waste management are implemented.	IEO	before commencement of operation

ASPECT	POTENTIAL IMPACT/RISK/ISSUE	MANAGEMENT ACTIONS & MONITORING	RESPONSIBILITY	FREQUENCY & DATE
3. OPERATIONAL PHASE				
	Review of waste management procedures	Waste management procedures must be reviewed and upgraded to meet the requirements of National Environmental Management Waste Management Act when it comes into force.	IEO	Within 3 months of enactment of the National Environmental Management Waste Management Bill

ASPECT	POTENTIAL IMPACT/RISK/ISSUE	MANAGEMENT ACTIONS & MONITORING	RESPONSIBILITY	FREQUENCY & DATE
4. PERMANENT CLOSURE AND DECOMMISSIONING				
PERMANENT CLOSURE AND DECOMMISSIONING		The decommissioning of this activity will require environmental authorisation for listed activity 23 of GN R386 of 2006.	IEO, PSM	Before decommissioning

4 MONITORING PLAN

PARAMETER	POSITION	MONITORING FREQUENCY	MONITORING METHOD	TESTING AND METHOD AND LABORATORY	UNITS	RESPONSIBILITY	DATA CAPTURE & STORAGE	ACTION THRESHOLD	REPORTING
Groundwater									
Groundwater Levels	2 upstream and downstream Boreholes	Monthly	Water levels taken and translated to height datum. Flow rates and pump rates and flow meter reading taken.	N/A	mm	IEO	Capture data in spreadsheet. Calculate Trends every 6 months. SHE office	To be updated after issue of EA if neccssary	Annual report to MDALA and DWAF
Groundwater Quality upstream and downstream of plant	2 upstream and downstream Boreholes	Monthly	Samples taken with a clean bailer.	Method - ICP 33 element scan, pH and Conductivity, Cr(iv)	µg/L, S/m	IEO	Capture data in spreadsheet. Update Trends analyses every 2 months. SHE office	To be updated after issue of EA and Integrated Water Use Licence.	
To be revised annually.									

PARAMETER	POSITION	MONITORING FREQUENCY	MONITORING METHOD	TESTING AND METHOD AND LABORATORY	UNITS	RESPONSIBILITY	DATA CAPTURE & STORAGE	ACTION THRESHOLD	REPORTING
Treated Residue									
Treated residue	Storage Bunker	Monthly	Composite of 10 random samples	Toxicity Characteristic Leaching Procedure as per DWAF Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste	µg/L	IEO	Capture data in spreadsheet. Update Trends analyses every month. SHE office	Cr(iv) exceeding ARL as per DWAF Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste	Annual report to MDALA
To be revised annually.									

PARAMETER	POSITION	MONITORING FREQUENCY	MONITORING METHOD	TESTING AND METHOD AND LABORATORY	UNITS	RESPONSIBILITY	DATA CAPTURE & STORAGE	ACTION THRESHOLD	REPORTING
Emissions to air									
Stack emission monitoring for: Cr(VI), and Cr(Total) NOx, and PM	Stacks emitting Cr(VI), and Cr(Total) NOx, and PM respectively	Quarterly in first year of operation. Bi annually there after	Iso kinetic sampling wher applicable and all stack flow and temperature measurements in accordance with ISO 9096: 2003.	Methods approved in terms of NEMAQA Section 21 Regulations to be promulgated (ISO methods or justifiable equivalent US EPA approved)	µg/Nm^3	IEO	Capture data in spreadsheet. Update Trends analyses every month. SHE office	Atmospheric emission license limits as derived from dispersion model emission inventory	Annual emission report in terms of section 36 of NEMAQA to DEAT Air quality & MDALA
To be revised annually.									

PARAMETER	POSITION	MONITORING FREQUENCY	MONITORING METHOD	TESTING AND METHOD AND LABORATORY	UNITS	RESPONSIBILITY	DATA CAPTURE & STORAGE	ACTION THRESHOLD	REPORTING
Ambient air quality									
Cr(VI) and Cr(Total)	Upwind and downwind of the plant	Every 12 days according to SOP MLD039 California EPA to enable the determination of an Annual average Cr(VI)	SOP MLD039 (Standard Operating Procedure for the Analysis of Cr(VI) at Ambient Atmospheric Levels by) of the California EPA Air Resources Board	Ion Chromatography as set out in SOP MLD039 California EPA	µg/Nm^3	IEO	Capture data in spreadsheet.	Ontario Canada 1.5ug/Nm^3	Annual air quality report in terms of section 36 of NEMAQA to DEAT Air quality & MDALA
Review of data monitored by DEAT and Eskom as part of Highveld Priority area	DEAT Middelburg Eskom Arnot	Annual data review	PM10 and PM 2.5 NOx SO2 O3	DEAT NEMAQA Regulations / SANS 1929 approved	ppbµg/Nm^3	IEO	Capture data in database.	SANS 1929	Annual air quality report in terms of section 36 of NEMAQA to DEAT Air quality & MDALA
To be revised annually.									

5 ENVIRONMENTAL INCIDENTS

An environmental incident is defined as any unplanned event that results in actual or potential damage to the environment, whether of a serious or non-serious nature. An incident may involve non-conformance with any of the following:

- Legal requirements;
- Requirements of the EMP;
- Requirements of the Record of Decision; and
- Any verbal or written order given by the ECO/PSM on-site.

Corrective actions to mitigate an incident must be appropriate to the nature and scale of the incident. Any residual environmental damage caused by the incident or by the mitigation measures themselves must also be rehabilitated. The contractor must also change his/her operating procedures, where applicable, to prevent a recurrence of an incident.

The IEO must inform the PSM and ECO of serious incidents immediately upon occurrence of the incident. The IEO must complete an Incident Report for all environmental incidents. The IEO shall investigate incidents in collaboration with the ECO with a view to determine the cause of the incident and to prevent a recurrence of similar incidents (not to apportion blame).

The ECO/IEO must send Incident Reports to the environmental authority on a monthly basis together with an audit report. In the case of serious incidents or emergencies, the incident report should be sent to the authority as soon as possible after the incident has been recorded.

6 CONCLUSION

This Environmental Management Plan should be used as an on-site reference document during all phases of the project, and auditing should take place in order to determine compliance with the EMP. Parties responsible for transgression of this EMP should be held responsible for any rehabilitation that may need to be undertaken. Parties responsible for environmental degradation through irresponsible behaviour/negligence should receive penalties.