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Gold One Cooke Operations: Full Plant Tailings Backfill Plant

Environmental Emergency Response Plan and Environmental Awareness Plan

Version - 1

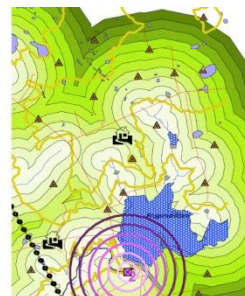
18 June 2013

Gold One Cooke Operations

GCS Project Number: 12-561

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GOLD ONE
INTERNATIONAL LIMITED



Environmental Emergency Response Plan and Environmental Awareness Plan

**Report
Version - 1**



18 June 2013

Gold One Cooke Operations

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EXECUTIVE SUMMARY

An Emergency Response Plan (ERP) and Environmental Awareness Plan (EAP) will be implemented at the Gold One Cooke Operations Backfill Plant (Gold One). The ERP and EAP will be implemented as part of the purpose to create environmental awareness and productivity in the management of potential impacts associated with the mining and its associated activities.

The material/source of information for the ERP and EAP will be the approved Environmental Management Programme (EMP), of which this EAP forms part, as well as all relevant specialist reports. These documents will be utilised to compile a database, as referred to in this ERP and EAP, which will contain all medium to high significant environmental aspects and issues. The environmental issues and aspects will be entered into the database with associated mitigation measures and responses, along with the specific legislation that governs such an impact or aspect.

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1 INTRODUCTION

An Environmental Awareness Plan (EAP) and Emergency Response Plan (ERP) will be implemented at the Gold One Backfill Plant. The EAP and ERP will be implemented as part of the purpose to create environmental awareness and productivity in the management of potential impacts associated with the project and its associated activities.

The material/source of information for the EAP and ERP will be the approved Environmental Management Programmes (EMP), of which this EAP forms part, as well as all relevant specialist reports. These documents will be utilised to compile a database, as referred to in this EAP and ERP, which will contain all medium to high significant environmental aspects and issues. The environmental issues and aspects will be entered into the database with associated mitigation measures and responses, along with the specific legislation that governs such an impact or aspect.

2 EMERGENCY RESPONSE PLAN

2.1 Defining an Environmental Response Plan

Environmental emergencies occur over the short term and require an immediate response. A mine, as part of its management tools, especially if it is ISO 9000 and ISO 14001 compliant, should have an Emergency Response Plan (ERP). If one does not exist then one should be compiled and disseminated to all employees and contractors and in the event of an emergency, the emergency response plan should be consulted.

This ERP should be placed around the mine where it will be easily viewed. The ERP should contain a list of procedures, evacuation routes and a list of emergency contact numbers. It is advisable that the mine regularly tests the emergency response plan in order to identify any areas for improvement.

If the emergency has the potential to affect surrounding communities, they should be alerted via alarm signals or contacted in person. The surrounding community will be informed, prior to mining taking place, of the potential dangers and emergencies that exist, and the actions to be taken in such emergencies.

Communication is vital in an emergency and thus communication devices, such as mobile phones, two-way radios, pagers or telephones, must be placed around the mine. A checklist of emergency response units must be consulted and the relevant units notified.

The checklist includes:

- Fire department;
- Police;
- Emergency health services such as ambulances, paramedic teams, poisons centres;
- Hospitals, both local and further afield, for specialist care;
- Public health authorities;
- Environmental agencies, especially those responsible for air, water and waste issues;
- Other industrial facilities in the vicinity with emergency response facilities;
- Public works and highways departments, port and airport authorities; and
- Public information authorities and media organisations.

2.2 Emergency Procedures

2.2.1 The Event of an Injury to any person

In the event of an injury to any person, a mine employee, contractor or visitor to site, the following procedure should be followed:

1. Take down details from the person reporting the incident including the following:
 - Telephone number of the person reporting the incident;
 - Nature of injuries to accident victim;

-
- If assistance is required from the paramedic;
 - Where the accident victim is located;
 - If transport is required to evacuate patient; and
 - Instruct the person reporting the incident to leave a messenger by the phone.
2. If the injuries are serious contact the relevant hospital/clinic or nearest paramedics.
 3. Await paramedics and instruct them to proceed to the accident site.
 4. Notify security and inform them of ambulance arrangements and where the said vehicle must go to.
 5. Inform the paramedic called out of the following:
 - Telephone number of the person reporting the incident;
 - Nature of injuries to accident victim or victims;
 - Location of injury on body (arm, leg, head, etc.);
 - Where the accident victim is presently;
 - What is the condition of victim (breathing, stable, etc?); and
 - If an ambulance is required to evacuate victim from surface location to hospital.
 6. If necessary provide a guide, at security gate, to escort the ambulance or paramedics to the required location.
 7. Inform your manager or the next senior manager of the accident.

NOTE:

The procedure does not change because there is more than one accident victim. One victim or 20 victims must be handled in the same manner.

2.2.2 Emergency Procedure for Duty Officials

In the event of a fire occurring in the plant area, the following actions and phases must be taken by the duty official:

First Phase:

1. Take down the following details of the incident from the reportee:
 - Nature of the incident, fire etc;
 - Location of the incident;
 - If there are casualties and the nature and extent of their injuries;
 - Ask if the reportee requires assistance (rescue team, doctor, paramedic, transport etc);
 - The phone number of the reportee; and
 - Name of person reporting the incident.
2. Based on the above-mentioned information, the official on duty will take a decision whether to evacuate any or all other work areas of the mine, making use of the current escape plan for the section or area.
3. Report the incident to the mine manager and the Subordinate Manager.
4. If the mine manager is unobtainable then report the incident to the next lowest level of official (engineer, mine overseer, etc).
5. Contact and call out the following personnel:
 - The mine doctor and paramedics;
 - Occupational hygienist;
 - The mine overseer for the incident area;
 - The mine engineer; and
 - The safety manager.
6. Begin a logbook or record of events putting in detail of times and who said what, where and when, going back to the original reportee.

NOTE:

- i. The official will assume the position of the incident controller until relieved of that position by the newly appointed incident controller, i.e. (mine manager, engineer, etc).
- ii. It is important to ensure that all phone messages are kept to a minimum duration throughout the incident period.

Second Phase:

1. If necessary send for ER 24, fire brigade, police, etc.
2. Give feedback to newly appointed incident coordinator once he is present on the mine and hand over role to new incident coordinator.
3. Follow instructions of Mine Manager.
4. Refer all media enquiries to head office legal department.
5. Remain in position at control room until relieved.
6. Brief official on current situation.

NOTE:

Remember to maintain the logbook at all times throughout the duration of the incident.

2.2.3 Process for Identifying Emergency Procedures

The process that will be used to identify emergency situations at the Gold One Backfill Plant will be conducted in terms of the Aspects Registers and may include the following emergencies:

- Radiation Exposure;
- Thickener Malfunction;
- Mixing Tank malfunction;
- Pipeline Spills;
- Hydrocarbon Spill (diesel, oil, grease, etc); and
- Veld Fires.

The necessary actions required, as well as the responsible person for ensuring that the actions are followed through and the reporting requirements are adhered to, to ensure effective and efficient response to each of the environmental emergency situations listed above are set out in this procedure.

2.2.3.1 *Most likely Potential Environmental Emergencies*

The following define the most likely potential environmental emergencies:

- Accidents;
- Fires;
- A major hydrocarbon spill or leak;
- A major spill or leak of process water or tailings slurry;
- Flooding;
- Radiation exposure;
- Subsidence; and
- Explosions.

Accidents:

In the case of a medical accident or problem, the mine should have at least a first aid kit available and a First Aid officer should be on duty at all times. It is preferential that the mine has a First Aid room or a small clinic. In the event of an emergency a checklist of emergency response units must be consulted and the relevant units notified. In this case, many of the emergency services will be sourced from the nearest main town, which is Westonaria or Randfontein.

Fire:

Veld fires and fires resulting from other sources must be handled with extreme caution. Fire extinguishers should be placed around the mine. The procedure to be followed involves the following:

- In the event of a fire, an alarm should be activated to alert all employees and contractors.
- Identify the type of fire and the appropriate extinguishing material. For example water for a grass fire, and mono ammonium phosphate based fire extinguisher for chemical and electrical fires.
- In the event of a small fire the fire extinguishers placed around the mine should be used to contain and extinguish the fire.

- In the event of a large fire, the local area council's fire department will be notified and should react timeously.
- All staff will receive training in response to a fire emergency on site.
- A Fire Association should be set up with the mine and surrounding land owners to facilitate communication during fire events and assist in fighting fires, where necessary.
- If possible all surrounding drains, such as storm water drains need to be covered and or protected to prevent any contaminated water from entering the drains.
- In case of a chemical or petroleum fire, run-off from the area should be contained as far as possible using the most appropriate measures e.g. spill absorbent cushions, sand or a physical barrier.
- Contaminated run-off must be diverted into an oil sump, or cleaned up.

Major Hydrocarbon Spill:

Hydrocarbons such as diesel, petrol, and oil will be kept on site as fuel for the mine machinery. In the event of a spillage, procedures must be put into place to ensure that there are minimal impacts to the surrounding environment.

Diesel, engine oil and hydraulic oil are the most likely hydrocarbons identified during impact assessments that can result in an emergency situation. The following procedure applies to a major hydrocarbon spill:

- In the event of a small spillage, the soil should be treated in situ, using Hazmat clean up kits.
- Every precaution should be taken to prevent the spill from entering the surface water environment.
- In the event of a large spillage, adequate emergency equipment for spill containment or collection, such as additional supplies of brooms and absorbent materials, will be available and if required, a specialised cleanup crew will be called in to decontaminate the area. The soil should be removed and treated at a special soil rehabilitation facility.
- Reasonable measures must be taken to stop the spread of hydrocarbons and secure the area to limit access.

- Dispatch necessary emergency services.
- The incident must be reported to the Environmental Control Officer immediately.
- The Environmental Control Officer will assess the situation from the information provided, and set up an investigation team of relevant personnel. Included in this team could be the Mine Manager, Chief Safety Officer, the employee who reported the incident and any individual responsible for the incident.
- When investigating the incident, priority must be given to safety.
- Once the situation has been assessed, the Environmental Control Officer must report back to the Mine Manager.
- The Mine Manager and the investigation team must make a decision on what measures can be taken to limit the damage caused by the incident, and if possible any remediation measures that can be taken.
- The Environmental Control Officer or person in charge should have a list of company contact details that will facilitate with the cleanup operations.

Major Water / Slurry Leak or Spill:

Burst high-volume dirty water pipelines or tailings slurry pipes have been identified as potential emergency situations. The following steps should be followed:

- Turn off all water supplies to the pipeline.
- Dispatch necessary emergency services.
- Take all reasonable measures to stop the spread of contaminated water / slurry.
- The incident must be reported to the Environmental Control Officer immediately.
- The Environmental Control Officer will assess the situation from the information provided, and set up an investigation team or relevant personnel. Included in this team could be the Mine Manager, Chief Safety Officer, the employee who reported the incident and any individual responsible for the incident.
- When investigating the incident, priority must be given to safety.

- Once the situation has been assessed, the Environmental Control Officer must report back to the Mine Manager.
- The Mine Manager and the investigating team must take a decision on what measures can be taken to limit the damage caused by the incident, and if possible any remediation measures that can be taken.

Flooding:

There is potential for flooding during the rainy season, but particularly November to January when severe thunderstorms can occur. This could result in a large volume of water flowing downstream or accumulating in a water containment facility and could cause major damage to equipment and endanger the lives of employees on site. Procedures must be put in place to ensure that there is a quick response to flood events and damage is kept to a minimum. The procedure for flooding includes:

- DWA's flood warning system should be reviewed annually.
- Mine management should be made aware of any such event so they can take appropriate action to ensure production losses are kept to a minimum.
- All dams and water containment facilities should have a 0.8 m freeboard and an overflow or outlet to ensure that no damage occurs to the facilities.
- All contaminated water should be contained on site, as far as possible and discharges to the environment should only occur if absolutely necessary in an extreme flood event.

Radiation Exposure:

Radiation exposure from spilled tailings slurry has been identified as potential emergency situations. The following steps should be followed:

- Turn off all supply to the pipeline.
- Dispatch necessary emergency services (Radiation clean-up team).
- Take all reasonable measures to stop the spread of tailings slurry.
- The incident must be reported to the Environmental Control Officer immediately.

- The Environmental Control Officer will assess the situation from the information provided, and set up an investigation team or relevant personnel. Included in this team could be the Mine Manager, Chief Safety Officer, Radiation Specialist, the employee who reported the incident and any individual responsible for the incident.
- When investigating the incident, priority must be given to safety.
- Once the situation has been assessed, the Environmental Control Officer must report back to the Mine Manager.
- The Mine Manager and the investigating team must take a decision on what measures can be taken to limit the damage caused by the incident, and if possible any remediation measures that can be taken.

Explosions:

Explosions can occur in the plant and workshop areas when working with gas cylinders and chemicals. These could result in large numbers of employees being injured and requiring medical assistance. The procedure for explosions includes:

- A Proto Team should be ready and deployed for assisting with the evacuation of employees;
- Alternative evacuation routes should be devised, should a rock fall occur as a result of the explosion;
- Alternative air supply routes should be identified and implemented; and
- All relevant emergency response units must be notified and hospitals informed of incoming patients.

Subsidence:

Subsidence underground can result in injuries to human life and damage to property. The procedure for subsidence includes:

- Alternative evacuation and access routes should be identified and used, should the way in or out be blocked;
- A Proto Team should be ready and deployed for assisting with the location and extraction of employees trapped underground;

- There should be alternative air supply routes should the air supply become damaged in the rock fall; and
- All relevant emergency response units must be notified and hospitals informed of incoming patients.

2.2.4 Emergency Preparedness and Response

Please refer to **Table 2.1** for the emergency preparedness and response to be followed at the Gold One Backfill Plant Operations.

Table 2.1: Emergency Preparedness and Response to be followed at the Tailings Backfill Plant Operation.

POSSIBLE ENVIRONMENTAL RELATED EMERGENCY	ACTION PLANS / REMEDIATION	TIME/PERIOD	RESPONSIBLE PERSON/PARTY
A major spill or leak of process water or tailings slurry	In the event of a small spill the soil will be treated in situ using a spill kit. In the event of a large spill a specialized crew will be called in to decontaminate the area and remove and rehabilitate the soil. The Environmental Control Officer will have the contact details of companies that provide this service.	Immediately	Manager / Plant Manager
Flooding	In the event of flooding, mine management should be made aware of any such event. All contaminated water should be contained on site, as far as possible and discharges to the environment should only occur if absolutely necessary	Immediately	Plant Manager
Radiation exposure	In the event of a small spill the soil will be treated in situ using a spill kit. In the event of a large spill a specialized crew will be called in to decontaminate the area and remove and rehabilitate the soil. Unnecessary contact with tailings should be avoided. The Environmental Control Officer will have the contact details of companies that provide this service.	Immediately	Manager/Plant Manager
Subsidence and Explosions	In the event of explosions or subsidence, the Mine management should be made aware of the event. A Proto Team should be ready and deployed for assisting with the evacuation of employees. Alternative evacuation routes and air supply should be available when needed. All relevant emergency response units must be notified.	Immediately	Manager/Plant Manager
Hydrocarbon Spill (diesel, oil, grease, etc)	In the event of a small spill the soil will be treated in situ using a spill kit. In the event of a large spill a specialized crew will be called in to decontaminate the area and remove and rehabilitate the soil. The Environmental Control Officer will have the contact details of companies that provide this service.	Immediately	Immediate Supervisor

POSSIBLE ENVIRONMENTAL RELATED EMERGENCY	ACTION PLANS / REMEDIATION	TIME/PERIOD	RESPONSIBLE PERSON/PARTY
Veld Fires	The responsible person must ensure that trained personnel are appointed and that firefighting equipment is in serviceable order. The responsible person must ensure that fire breaks are maintained. The responsible person must undertake periodic inspections of firefighting equipment. In the event of a fire on site the fire master and fire fighting crew must immediately respond and in instances where the mines fire fighting team is unable to control the fire, the services of the local municipal fire brigade must be called in. The fire master is responsible for ensuring that adequate arrangements are made with the local municipal fire brigade to ensure timeous response to veldt fires.	Immediately	Fire Master/Safety Officer

2.2.5 Reporting

The responsible person will as soon as possible verbally report the occurrence to the Mine Manager and the Environmental Management Representative. A detailed non-conformance report will be written by the responsible person and handed in to the Environmental Department for investigation.

Environmental Incidents which may cause pollution of water resources will be reported to the Department of Water Affairs in accordance with the requirements of the National Water Act, 1998 (Act No. 36 of 1998). If necessary, the Department of Mineral Resources and/or the Gauteng Department of Agriculture and Rural Development will be notified of the occurrence by the Environmental Management Representative.

2.2.6 Emergency Response Testing

Emergency response testing will be undertaken on an annual basis and it is the responsibility of the Environmental Management Representative to determine what tests should be conducted on mentioned potential emergency situations. Consideration to the practicalities involved will be taken and efforts should be undertaken to affect minimum disruption to the operations. As such it is preferable to conduct mock tests. Once a mock test has been done, a meeting will be held between interested parties to validate if planned arrangements were effective and responses were adequate.

2.2.7 Records

Records derived from the implementation of this procedure will be controlled in accordance with the requirements as defined in the necessary Standard Operating Procedure (SOP) developed, available in the Environmental Management System documents.

2.3 Emergency Incident Reporting

Environmental incident reporting will be a vital part of communication at the Gold One operations. Employees will be required to report any and all environmentally related problems, incidents and pollution, so that the appropriate litigator action can be implemented timeously. In the event of an Environmental Incident, the reporting procedure as indicated in **Table 2.2** should be followed.

Table 2.2: Environmental Incidence Reporting Procedures.

ENVIRONMENTAL INCIDENT REPORTING STRUCTURE	ACTIONS REQUIRED
Person causing or observing the incident	<ul style="list-style-type: none"> • Shall report the incident to an immediate supervisor in the area/section where the environmental incident is observed.
Line Management in relevant area of responsibility where the incident occurred	<ul style="list-style-type: none"> • Shall investigate the incident and record the following information: <ul style="list-style-type: none"> ○ How the incident happened; ○ The reasons the incident happened; ○ How rehabilitation or clean up needs to take place; ○ The nature of the impact that occurred; ○ The type of work, process or equipment involved; and ○ Recommendations to avoid future such incidents and/or occurrences. • Shall inform the Environmental Manager and the Mine Manager on a daily basis of all incidents that were reported in the area/section. • Shall consult with the relevant department/person for recommendations on actions to be taken or implemented where appropriate (e.g. clean-ups). • Shall assist the Environmental Manager and/or Mine Manager with applicable data in order to accurately capture the incident into the reporting database.
Area/Line Managers	<ul style="list-style-type: none"> • Shall forward a copy of the incident form to other line managers. • Shall forward a copy of the incident form to the Environmental Manager.

ENVIRONMENTAL INCIDENT REPORTING STRUCTURE	ACTIONS REQUIRED
	<ul style="list-style-type: none"> • 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. • Shall forward a copy of the completed Incident Reporting Form (and where applicable a copy of the incident investigation) to the relevant department/person.
Environmental Manager/Line Manager	<ul style="list-style-type: none"> • Shall complete an incident assessment form to assess what level of incident occurred. • Shall make recommendations for clean-up and/or appropriate alternate actions. • Shall enter actions necessary to remediate environmental impacts into the database in conjunction with the responsible line manager. • Shall enter the incident onto the database in order to monitor the root causes of incidents. Shall include the reported incidents in an appropriate monthly/quarterly report. • Shall highlight all incidents for discussion at HSEC meetings.

3 ENVIRONMENTAL AWARENESS PLAN

3.1 Communication Sectors

The communication of the environmental risks for each phase of the project will take place for the management, administrative and mine worker sectors of the mine, as well as contractors.

3.1.1 *Management Sector*

A workshop will be conducted to inform all mine management of the risks associated with the mining operation. The risks for all aspects will be explained and the appropriate management options discussed. The workshop will also elaborate on the monitoring programmes that will be implemented to identify and monitor the mines level of impact on the environment and discuss various remediation actions, should there be deterioration.

The evaluation process is integral in the assurance that the mine reduces any possible environmental risks associated with the operation.

The workshop will be conducted prior to the construction phase to ensure that all risks are discussed before there is any chance of the impacts occurring. The workshop may be repeated at certain stages during the life of the project, in the case of new employees.

3.1.2 *Administrative Sector*

The communication of the environmental risks to the administrative sector will occur through a workshop/half day course. This workshop will seek to explain the following necessary actions:

- Firstly, each aspect will be described as shown in **Table 3.1**, **Table 3.2** and **Table 3.3**. Risk associated with each aspect will be discussed to ensure that there is an understanding of how each action of the project may impact on the environment.

- The mitigation of the environmental risk will be elaborated on. It is important that each person understand these management strategies as it ensures that the impact on the environment is kept to a minimum. Data collection regarding each aspect will also be explained to ensure that each aspect is monitored according to those protocols specified by the mine and the DMR. Along with data collection the reporting of findings will be discussed.
- This workshop will take place before the construction phase begins, thus ensuring a full understanding of the project and its associated environmental risks before any construction activity is undertaken. The course will be repeated at the beginning of the operational phase and the material will be integrated in the induction for new personnel.
- The following communication channels and media will/can be used to communicate environmental issues within the Gold One Backfill Plant Operation:
 - HOD Meetings: The Mine Manager communicates information to senior management on environmental issues and the information is minuted.
 - HSEC Meetings: 'Environmental issues' should be an agenda item on plant and section monthly safety, health & environmental meeting agendas.
 - Publications: Leaflets, posters etc. are produced by the relevant department or other designated persons, for use on notice boards, and distribution. Quarterly newsletter will also be made available. Email notifications and or relevant articles are also distributed.
 - EMS Database (if established): Feedback from line management on objectives, targets and actions.
 - Daily/Weekly Safety Meeting: All meetings are scheduled to commence with a discussion on safety, health & environmental topics.

3.1.3 *Mine Workers Sector*

The mine workers associated with the construction activities will attend a half day (minimum) induction course to ensure that each person is aware of the environmental risks associated with the project. This induction will form part of the health and safety induction. This induction course will explain and describe the relevant phases of the project as well as those environmental risks that may occur during these phases. The environmental risks of each aspect as well as the mitigation will be elaborated on.

3.1.4 *Contractors*

An environmental awareness section will be added to the contractors health and safety induction programme. The environmental induction will focus on activities that carry an environmental risk, actions to be taken to reduce these risks, and procedures to be followed in the event of an incident.

Table 3.1: Environmental Awareness Plan for the Construction Phase at the Gold One Backfill Plant Operation

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
Soil	Increase in soil erosion and compaction	Workshop	Induction	Induction	Induction	Rehabilitate area as soon as possible
	Topsoil removal	Workshop	Induction	Induction	Induction	Rehabilitate area as soon as possible Make use of existing roads and/or areas Keep the footprint of the disturbed area to the minimum

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
	Contamination of soil	Workshop	Induction	Induction	Induction	<p>All hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored;</p> <p>Spill kits should be readily available and all employees must be trained in the utilization thereof;</p> <p>Should a spill take place the area should be cleaned immediately and the contaminated area will be rehabilitated as appropriate;</p> <p>Prevent spillages by the implementation of good housekeeping practices;</p> <p>The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme;</p> <p>In the event of a major spill that could result in major soil and water contamination the DWA should be informed immediately and a remediation strategy should be enforced;</p> <p>The management of chemicals and hydrocarbons should form part of the emergency preparedness and response programme;</p>
12-561				18 June 2013		<p>No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area.</p>

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
Fauna and Flora	Disturbance to Fauna and Flora	Workshop	Induction	Induction	Induction	Workers must be educated on animal species Report any rare or endangered species Hunting and trapping of fauna will be strictly prohibited Limit the area of disturbance to the footprint area of the affected sites only Monitor for exotic and invasive species on an annual basis. A sweep must take place to determine small mammal colonies before digging areas.
	Toxic pollution	Workshop	Induction	Induction	Induction	Provide adequate waste disposal facilities; Manage operational issues with respect to hygiene, ablution and food provision;
Surface Water	Surface Water Contamination	Workshop	Induction	Induction	Induction	A dedicated area for the placement of waste skips must be determined and cemented. Allowance for keeping clean water run-off away from the skip area through the correct bunding design. Soil contaminated with fuel or oil spills will

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
						<p>be collected and treated at a pre-determined and dedicated location, or will be treated in situ using bioremediation, in accordance with Gold One’s existing procedures.</p> <p>If required, contaminated soil will be disposed of at a licensed facility.</p> <p>Vehicles will be maintained regularly and kept in a good working order.</p> <p>Vehicle maintenance will not be carried out on the construction site, but in existing Gold One and/or contractor workshops.</p>
	Increased suspended matter	Workshop	Induction	Induction	Induction	<p>Stabilise banks using: brush-cut packing, mulch or chip cover, sand bags, straw stabilising, sodding, hydroseeding, the application of soil binders and physical stabilisation methods such as gabions, reno-mattresses, armour flex or retaining walls.</p> <p>The total footprint area to be disturbed / developed will be kept to a minimum</p> <p>Monitor the new vegetation growth as the</p>

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
						project progresses.
Groundwater	Groundwater Contamination	Workshop	Induction	Induction	Induction	<p>Allowance for keeping clean water run-off away from the skip area through the correct bunding design.</p> <p>A dedicated area for the placement of waste skips must be determined prior to operational activities, and the area will have to be cemented.</p>
Air Quality	Generation of Dust	Workshop	Induction	Induction	Induction	Dust suppression methods will be implemented.
Wetlands and Aquatics	Wetland disturbance and alteration	Workshop	Induction	Induction	Induction	<p>Construction vehicle movement should be kept to a minimum within the wetland.</p> <p>Any alteration to the wetland habitat should be rehabilitated.</p>
	Wetland and aquatic habitat contamination	Workshop	Induction	Induction	Induction	<p>Construction rubble should be removed from wetland by labourers</p> <p>All hazardous substances used during the establishment of infrastructure should be stored on impervious surfaces that allow for the containment of spills and leakages (e.g.</p>

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
						<p>bunded areas).</p> <p>Larger spills will require the appointment of specialist clean-up teams to rehabilitate the affected area.</p> <p>No hazardous materials may be stockpiled in any wetland area on site.</p> <p>Sufficient spill clean-up materials should be kept on site at all times.</p>
	Soil compaction	Workshop	Induction	Induction	Induction	<p>Areas for construction should be fenced off.</p> <p>If compacting occurs, soils should be ripped using labourers on foot to avoid further compacting."</p>
	Change in aquatic system structure and functioning	Workshop	Induction	Induction	Induction	<p>The proposed pipelines routes should make use of existing river crossings where possible.</p> <p>In the event that a "new" crossing area is required, the pipelines spanning the river systems should be raised and supported above ground so as not to require the removal of the riparian vegetation.</p>
Noise	Noise disturbance	Workshop	Induction	Induction	Induction	Switch off equipment when not in use.

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
						<p>Limiting construction activities to daylight hours where possible.</p> <p>Project-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installing exhaust mufflers.</p>
Traffic	Heavy machinery will at times disrupt traffic.	Workshop	Induction	Induction	Induction	<p>The contractor should communicate the construction schedule and vehicle movements to the neighbouring property owners</p> <p>Implement a strict penalty fine system for speeding incidents.</p>
Heritage Sites	Damage to heritage sites	Workshop	Induction	Induction	Induction	<p>The built structures should be fenced in order to avoid unwanted damage</p> <p>Prevent vehicle movement not to be within the proximity of the structures.</p>

Table 3.2: Environmental Awareness Plan for the Operational Phase at the Gold One Backfill Plant Operation

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
Soil	Increase in soil erosion and compaction	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	Rehabilitate area as soon as possible; Make use of existing roads and/or areas and roads designated for the mining operation where possible.
	Soil Contamination	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	All hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored; Spill kits should be readily available and all employees must be trained in the utilization thereof; Should a spill take place the area should be cleaned immediately and the contaminated area will be rehabilitated as appropriate; Prevent spillages by the implementation of good housekeeping practices; In the event of a major spill that could result in major soil and water contamination the DWA should be informed immediately and a remediation strategy should be enforced;

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
						No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area.
Flora and fauna	Impacts on habitat and functioning	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	Provide adequate waste disposal facilities; and implement waste sorting and the re-use of materials. Monitor the pipeline daily to ensure that leakages do not negatively affect the surrounding ecosystems.
	Vegetation destruction and weed encroachment	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	Report any rare or endangered species; and A weed control programme will be implemented.
Surface Water	Surface Water Contamination	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	All contaminated water to be stored - zero discharge policy; and If a spill occurs, it will be contained and cleaned up as quickly as possible. Tailings material that has spilled from the pipeline will be cleaned up in accordance

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
						<p>with Gold One’s existing procedures.</p> <p>Regular maintenance and monitoring of blockages and leakages</p> <p>The pipelines crossing across the Wonderfonteinspruit will be encased within a casing to contain any spills.</p> <p>The drainage sump must be sized to contain the volume of the pipeline draining to that point.</p> <p>Installation of shut off valves upstream of the river crossing.</p> <p>Installation of pressure and/or flow differential sensors to shut pumps down should a rupture occur in the pipeline.</p> <p>The drainage sump must be positioned outside of the 1:100 year floodline.</p> <p>Pipeline flow directions must be marked on the outside of the pipeline using weather resistant paints or labels.</p>
Groundwater	Groundwater	Workshop	Induction	Induction &	Induction &	Water ingress into the underground mining

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
	Contamination			Monthly Meeting	Monthly Meeting	<p>sections will be prevented to limit acid mine drainage;</p> <p>Ensure that the waste is removed and disposed of in a prescribed/correct manner, and must be stored in a designated area as part of the waste management strategy.</p> <p>Waste generated will be collected and disposed of in a licensed waste facility</p> <p>Allowance for keeping clean water run-off away from the skip area through the correct bunding design.</p> <p>Where a spill occurs, the spillage should be contained and cleaned as quickly as possible.</p> <p>All hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored.</p> <p>Bunded areas should not allow seepage of pollutants into the ground or the run-off of polluted water.</p> <p>In the event of a major spill that could result</p>

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
						<p>in major soil and water contamination the DWA should be informed immediately and a remediation strategy should be enforced.</p> <p>No activities associated with hydrocarbons and or chemicals (i.e. wash bays etc.) may be undertaken outside of an effectively designed contained area.</p>
	Ingress into underground workings	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	Ensure that boreholes are installed properly during construction to avoid the ingress of water into the underground workings.
Air Quality	Generation of Dust from binder material	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	During offloading of binder material, the dust will be contained through mechanical means (extraction or filtration)
Wetlands and Aquatics	Wetland and Aquatic system contamination	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	<p>The pipeline should be constructed with containment paddocks downslope of the stream/wetland.</p> <p>The pipelines should be monitored daily for leaks or faults.</p> <p>Faults should be reinforced if detected to avoid spillage.</p>

ENVIRONMENTAL PARAMETER	RISK	COMMUNICATION STRATEGY				MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
						<p>Slurry should be cleaned by sweeping up the entire spill present and putting it into containers until it can be disposed of at the applicable site.</p> <p>The water quality within the wetland should be monitored</p> <p>The faunal and floral species present and ecological integrity should be monitored</p> <p>Where a spill does occur, it should be contained and cleaned as quickly as possible.</p> <p>Spill kits and training for use thereof to be at hand at all times</p>
Noise	Noise nuisance	Workshop	Induction	Induction & Monthly Meeting	Induction & Monthly Meeting	Implement and maintain equipment according to management plan.

Table 3.3: Environmental Awareness Plan for the Closure and Decommissioning Phase at the Gold One Backfill Plant Operation

ENVIRONMENTAL PARAMETER	RISK	1. COMMUNICATION STRATEGY				2. MITIGATION ACTIVITY
		MANAGEMENT	ADMINISTRATION	MINE WORKERS	CONTRACTORS	
Soil	Soil contamination	Workshop	Workshop	Induction	Induction	Continue to implement the waste management strategy Clean and dirty water systems should be maintained until closure or when the area is free-draining.
	Soil compaction or erosion	Workshop	Workshop	Induction	Induction	Restrict vehicle movement to existing roads. Reclamation of soil includes shaping of land back to the original land forms while roads must be cleared of all pavement material, ripped and vegetated using site specific vegetation. Rip compacted soils to avoid excessive runoff Restore water infiltration, and reduce surface water runoff.
Flora and fauna	Disturbance of fauna and flora	Workshop	Workshop	Induction	Induction	Keep the footprint of the area to the minimum and designated areas only. Vegetate immediately to limit erosion. Planting of indigenous plants will aid rehabilitation of exposed areas.

						A weed control programme will be implemented.
Surface Water	Water Quality	Workshop	Workshop	Induction	Induction	<p>Detailed water monitoring programme to be implemented.</p> <p>Contaminated water and spillages will be captured in water tight containers/structures on site and removed by a licensed waste management service provider for disposal at a licensed facility.</p> <p>Pipes and equipment must be drained and flushed before dismantling.</p>
Air Quality	Generation of Dust	Workshop	Workshop	Induction	Induction	<p>Dust suppression methods will be implemented on roads.</p> <p>Barren areas will be re-vegetated as soon as possible during decommissioning and closure.</p>
Wetlands and Aquatic systems	Environmental contamination	Workshop	Workshop	Induction	Induction	<p>After closure of the mine the pipelines should be cleaned and removed.</p> <p>Where a spill occurs, the spillage should be contained and cleaned as quickly as possible.</p> <p>Complete removal of all infrastructure and waste must be ensured</p> <p>All vehicles and activity should remain within the disturbed areas</p> <p>Re-vegetate the area with indigenous species as</p>

						<p>determined by a wetland specialist / botanist.</p> <p>Implement a wetland rehabilitation program</p>
Noise	Noise disturbance	Workshop	Workshop	Induction	Induction	<p>Project-related machinery and vehicles must be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installing exhaust mufflers.</p> <p>Switch off equipment when not in use. Limiting decommissioning activities to daylight hours where possible</p>

3.2 Methods of Communication

3.2.1 Induction

All full time staff and contractors are required to attend an induction session. Employees are inducted when they start at the mine and 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 Head of Department (HOD) induction training. These workshops will be conducted in English, as well as one of the local languages. This induction will form part of the health and safety induction.

Environmental issues and aspects related to the operation phase and other relevant phases will be addressed in the induction sessions. All environmental impacts and aspects and their mitigatory measures will be discussed, explained and communicated to employees. The induction sessions will be modified according to the level of employee attending the induction session, so that all employees gain a suitable understanding of environmental issues and pollution.

Environmental awareness forms part of the induction course. The outcome of the environmental component is to educate all Gold One employees and contractors of the concepts of sustainability and how this applies to Gold One as well as the individual. The following syllabus of environmental training is to be included within the induction course:

- Discuss the latest Gold One specific environmental goals and objectives and the benefits of achieving such goals. As these goals change, the induction course must be updated accordingly. Where possible, the goals and objectives covered should be selected on the basis of topics that personnel can relate to;
- Discuss a Gold One specific environmental objective that has recently been achieved and the benefits of this achievement to Gold One staff members; and
- Concepts surrounding the living of a sustainable lifestyle, that can be implemented both at work and at home, should be discussed.

3.2.2 Environmental Symposiums

Environmental symposiums can be held with management, and selected groups of supervisors/foremen and/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 to assist the relevant department in defining all and identifying new environmental issues, concerns and pollution sources.

3.2.3 In-house Training

In-house training sessions will be held with relevant employees. The training sessions will be determined by the relevant department, and will 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.

3.2.4 On the Job Training

On the job training is an essential tool in environmental awareness. Employees will be given details of the expected environmental issues and concerns specifically related to their occupation. Employees will 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.

3.2.5 General Training and Skills Development

Human Resources Development Programmes will 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 skill will be included in this training.

3.2.6 Environmental Open Days

Environmental open days will be arranged for at least once a year by Gold One Operations environmental/management and liaison departments. Open days will be utilised to discuss environmental issues in a less formal manner, thereby allowing employees the opportunity to participate in environmental management by educating them about environmental pollution and waste management in areas beside the workplace (e.g. at home). The open days will not be confined to employees only, but to identified Interested and Affected Parties including surrounding landowners and all stakeholders, so as to ensure that the principles of environmental management, pollution prevention, waste management and sustainable development are communicated to the communities surrounding the operation.

3.2.7 Other

Other ways of engagements which can help in increasing the awareness of the community regarding environmental constraints and opportunities shall be implemented where necessary. At corporate level, this includes providing support for NGOs involved with specific environmental awareness programmes.

3.3 Environmental Communication Strategies at Gold One

Gold One Backfill Plant management shall continue to establish and maintain procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to relevant communication from external Interested and Affected Parties. The communication of the environmental risks for each phase of the project will take place for the management, administrative and mine worker sectors of the mine, as well as contractors. The organisation shall consider processes for external communication on its significant environmental aspects and record its decision.

Communication is a management responsibility. All supervisors are responsible for effective communication within their own sections. Environmental communication can be divided into two categories: internal communication and external communication.

3.3.1 *Internal Communication*

Internal communication is done within the Administrative Sector. Refer to Section 3.1.2 for details pertaining to internal communication within the administrative sector.

3.3.2 *External Communication Strategies*

The following communication channels and media will/can be used to communicate environmental issues to individuals who are not employed by Gold One:

- **Environmental Committee:** An Environmental Committee should be established and used as a forum to keep interested and affected parties informed of the significant environmental aspects identified through the Environmental Impact Assessments and Management Plans. This should also be the forum where interested and affected parties get the opportunity to raise environmental concerns. Records must be kept of all decisions and concerns. The Environmental Committee should be chaired by the Mine Manager, or another appropriately appointed competent individual.
- **Publications:** Selected publications should be produced and used to communicate environmental issues to outside parties. Examples include newsletters and Annual Reports.
- **Communication from External Parties and Employees:** A clear communication point should be established within the company that will be responsible for liaison with the media in respect of any crisis that may arise within the Gold One operation. A complete procedure for media liaison must be made available to all employees. Communication from external interested and affected parties may be received by e-mail, fax, telephonically or by mail. Where required, a written response will be sent, on receiving such communication, by the appropriately appointed individual under signature of the Mine Manager, to the respective interested and/or affected party. All telephonic or facsimile correspondence received on the mine must be forwarded to the relevant department for action. All events or concerns will be captured and actioned on an existing and/or future database.
- **E-mail:** E-mail communication received must be stored, with replies, in an appropriate folder on a server. E-mail messages, relevant to environmental management, should be kept for a minimum of two years before deletion.

- **Mail:** Correspondence received by mail must be filed, along with the response (where relevant), within the relevant department's filing system for a minimum period of two (2) years. Paper correspondence will be archived in this department.
- **Telephone:** A register of telephonic environmental queries should be kept by the relevant department detailing caller, contact details, date, query, action taken and response. Furthermore, the person answering the call will be responsible for logging their particulars against the call, as well as ensuring that all communication that leads to an aspect or an impact, is entered on the database.
- **Storage of Correspondence:** All original correspondence must be retained by the gold One Mine Manager for a minimum period of two (2) years.
- **Environmental Reports:** Copies of relevant specialist study reports and Environmental Impact Assessments will be available on request from an external party by the Mine Manager.
- **Queries from Interested and Affected Parties:** Response to queries about environmental impacts and aspects will be addressed by the relevant department, and approved by the Mine Manager.
- **Queries and Requests from the Media:** Requests for articles from the media on environmental issues at Gold One will be co-ordinated by the HR Manager, with input from the relevant department, as approved by the General Manager, in line with the Gold One Communication Strategy. The Communication Strategy must be based on a behavioural approach. Due to the environmental awareness generated by induction, on the job training etc, employees are able to identify environmental problems, issues, concerns and pollution timeously.

3.4 Evaluation of the Environmental Awareness Plan

The evaluation of the environmental awareness plan will be conducted by the management of the mine. This evaluation will entail the auditing of the operation in both the construction and operation phase once activity has commenced.

The environmental awareness plan described above is sufficient to make all those involved in the project aware of those risks that may occur as well as the necessary mitigation required to minimize these risks. The awareness plan indicates that Gold One is serious about the environments wellbeing, empowerment of the local people and returning the land to the appropriate use in the future. Environmental issue will be highlighted at monthly meetings scheduled at the mine.

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