

**ZITHOLELE CONSULTING (PTY) LTD**

**KUSILE POWER STATION 60 YEAR ASH DISPOSAL FACILITY:  
WASTE MANAGEMENT FACILITY LICENCE APPLICATION  
REPORT  
EMERGENCY PREPAREDNESS PLAN**

Report No.: JW009/14/D121 - Rev 1

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**Jones & Wagener**  
Engineering & Environmental Consultants  
59 Bevan Road PO Box 1434 Rivonia 2128 South Africa  
tel: 00 27 11 519 0200 [www.jaws.co.za](http://www.jaws.co.za) email: [post@jaws.co.za](mailto:post@jaws.co.za)

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## 1. INTRODUCTION

### 1.1 Background

Kusile Power Station will be Eskom's twelfth base load coal-fired power station after construction is completed. The station will comprise of six 800 Megawatt units which will place it on par with the largest coal-fired power stations presently in the world. Anglo Coal's New Largo mine is located adjacent to Kusile on its eastern side and is likely to supply power station coal to Kusile over its expected 60 year life time.

Kusile will feature new super critical boilers which will operate at higher temperatures and pressures than older boilers providing better efficiency. The power station will burn approximately 1 850 tons of coal per hour over all six units, producing 900 tons of ash per hour. A total volume of over 530 million cubic meters of ash will be produced over the power station's 60 year life time. Therefore the ash disposal facility (ADF) forms an integral part of the power station's infrastructure.

### 1.2 Purpose of this document

An Emergency Preparedness Plan lists possible emergencies and details the actions required in each case. In terms of this plan, an emergency is defined as:

*“an unexpected and sudden event or situation which may be/is likely to endanger life, damage to the environment or health that must be dealt with as soon as possible”.*

The purpose of this document is to provide an Emergency Preparedness Plan for the Kusile Power Station 60 year Ash Disposal Facility. This is required in terms of the Department of Environment's waste management licensing requirements.

**JONES & WAGENER (PTY) LTD** REG NO. 1993/002655/07 VAT No. 4410136685

**DIRECTORS:** GR Wardle (Chairman) PrEng MS(Eng) FSAICE D Brink (CEO) PrEng BEng(Hons) FSAICE J P van der Berg PrEng PhD MEng FSAICE J E Glendinning PrSciNat MS(Env Geochem) MSAIEG A Oosthuizen (Alternate) PrEng BEng(Hons) MSAICE  
**TECHNICAL DIRECTORS:** PW Day PrEng DEng HonFSAICE PG Gage PrEng CEng BS(Eng) GDEMSAICE AIStructE JR Shamrock PrEng MS(Eng) MSAICEMWMSA N Vermeulen PrEng PhD MEng MSAICE HR Aschenborn PrEng BEng(Hons) MSAICE M van Zyl PrSciNat BS(Hons) MIWMSA MW Palmer PrEng MS(Eng) MSAICE T G le Roux PrEng MEng MSAICE AJ Bain PrEng BEng MSAICE M Rust PrEng PhD MSAICE M Theron PrEng PhD MEng MSAICE  
**ASSOCIATES:** BR Antrobus PrSciNat BS(Hons) MSAIEG PJ Smit BEng(Hons) AMSAICE R Puchner PrSciNat MS(Geol) MSAIEG IMAEG M van Biljon PrSciNat MS(Hydrogeology) JS Msiza PrEng BEng(Hons) MSAICEMWMSA RA Nortjé PrEng MS(Eng) MSAICEMWMSA GB Simpson PrEng MEng MSAIEMSAICE C Cilliers PrEng BEng(Hons) MSAICE NW Nxumalo PrEng BS(Eng) MSAICE  
**CONSULTANT:** JA Kempe PrEng BS(Eng) GDEMSAICE AIStructE  
**FINANCIAL MANAGER:** HC Neveling BCom MBL



## 1.1 Definitions and abbreviations

### 1.1.1 Commercial

<b>J&amp;W</b>	Jones & Wagener (Pty) Ltd – Design Engineers
<b>DEA</b>	The Department of Environmental Affairs
<b>DMR</b>	The Department of Mineral Resources

### 1.1.2 Technical

#### *Design:*

<b>ADF</b>	Ash Disposal Facility
<b>CQA</b>	Construction Quality Assurance
<b>CQC</b>	Construction Quality Control
<b>CDF</b>	Co-Disposal Facility
<b>HDPE</b>	High Density PolyEthylene
<b>GM</b>	Geomembrane
<b>GX</b>	Geotextile
<b>GL</b>	Ground Level
<b>LCS</b>	Leachate Collection System
<b>LDS</b>	Leakage Detection System
<b>PCD</b>	Pollution Control Dam
<b>TLB</b>	Tractor Loader Backhoe

#### *Other:*

<b>EIA</b>	Environmental Impact Assessment
<b>EIR</b>	Environmental Impact Report
<b>SED</b>	Safe Edge Distance
<b>FS</b>	Front Stack

### 1.1.3 Definitions

**Back Stack:** Ash stacked on top of the front stack (see **front stack**) behind the shiftable conveyor. The back stack is the final height of the facility.

**Boom Conveyor:** Cantilevered, slewable, luffable conveyor. Final delivery of ash onto the ash facility.

**Crawler Mounted Stacker:** Mechanised ash stacking machine connecting boom conveyor to the link conveyor.

**Emergency Offload Platform:** Concrete platform used for temporary ash storage if one or both stackers are out of commission.

**Extendable Conveyor:** Conveyor that is continuously extended as the ash stack advances. The extendable conveyor supplies ash to the shiftable conveyor and is supplied ash by the overland conveyor at the ash disposal facility transfer house.

**First Ash:** The first ash that is created by the power station after the first coal is burned.



**Free Ash:** Ash that is placed by a stacker which does not require further dozing.

**Front Stack:** Ash stacked from the level of the stacker to a lower level – either natural ground or lower ash stack. The front stack is placed in front of the shiftable conveyor.

**Link Conveyor:** Conveyor between the stacker and the tripper car.

**Overland Conveyor:** Conveyor that transfers ash from the power station to the ash disposal facility. The overland conveyor connects to the extendable conveyor at the ash facility at a transfer house.

**Shiftable Conveyor:** Conveyor that is shifted parallel to the direction of advancement or rotated radially about a fixed point. The shiftable conveyor supplies the tripper car with ash and also includes rails for the car to travel on. The shiftable conveyor is supplied ash by the extendable conveyor.

**Transfer platform:** A platform used to support a transfer point between two or more conveyors when a change in direction is required.

**Tripper car:** Mechanised machine used to transfer ash from the shiftable conveyor onto the link conveyor which leads to the stacker. The tripper car is able to move along the rails connected to the shiftable conveyor.

## 2. DESCRIPTION OF FACILITY

### 2.1 Site Layout

The site, as shown in Figure 1, is positioned south of the power station and the Co-disposal Facility. It is wedge shaped, starting wide in the north and becoming narrower as it develops southwards.

The space available for the facility is limited which leads to the ash stack requiring a substantial starter platform so that the stack is near final height at the commencement of stacking. The starter platform will be constructed from ash using a truck and haul operation. The platform will be lined.

The site is characterised by a valley draining from the south-east to the north-west (forming the Holfontein Spruit River). This valley will continue to lead clean storm water into the site for the duration of operations and therefore requires a combination of contour cut-off drains and clean stormwater attenuation dams. A dam and a diversion canal system upstream of the New Largo Phola Conveyor will also be required.

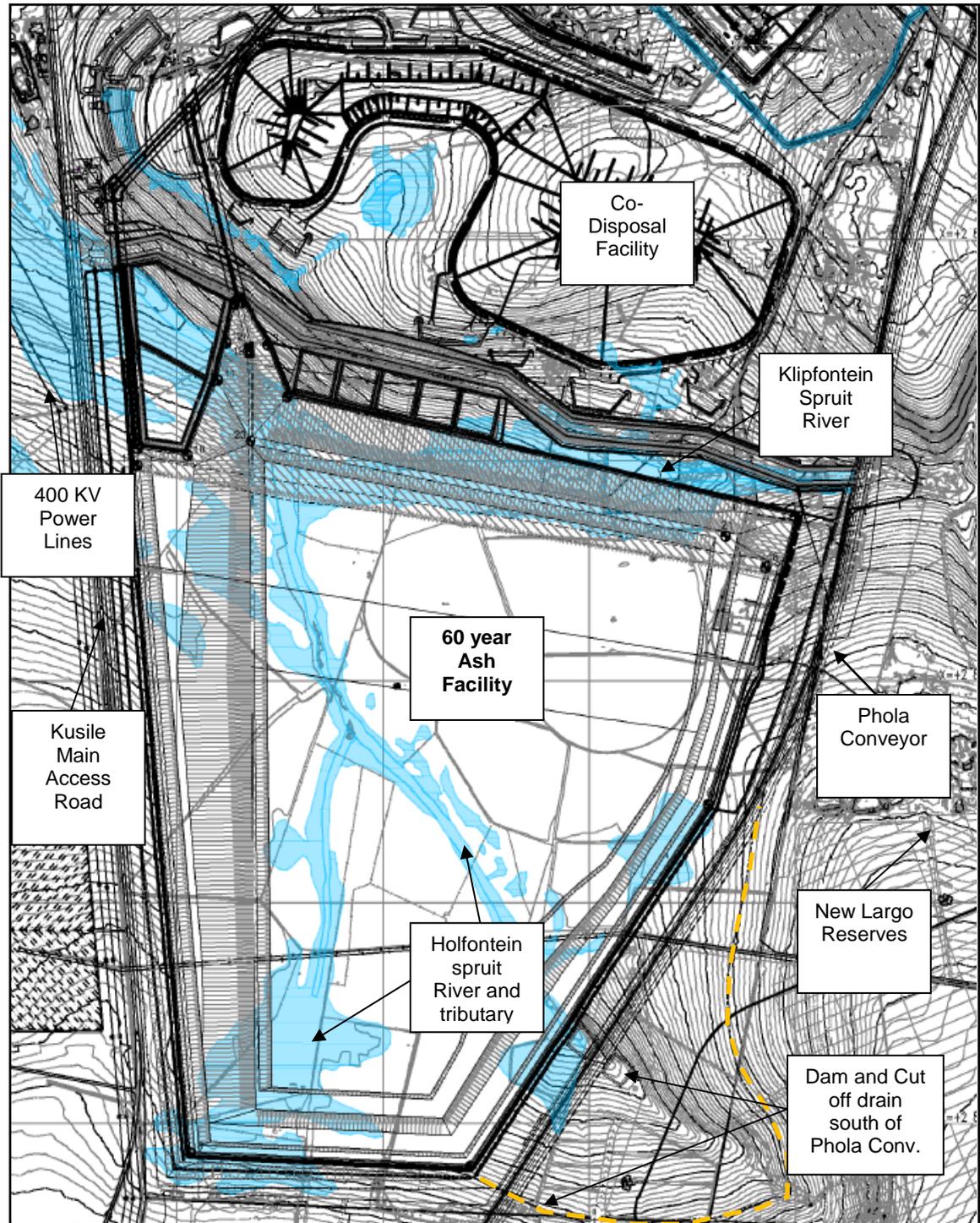
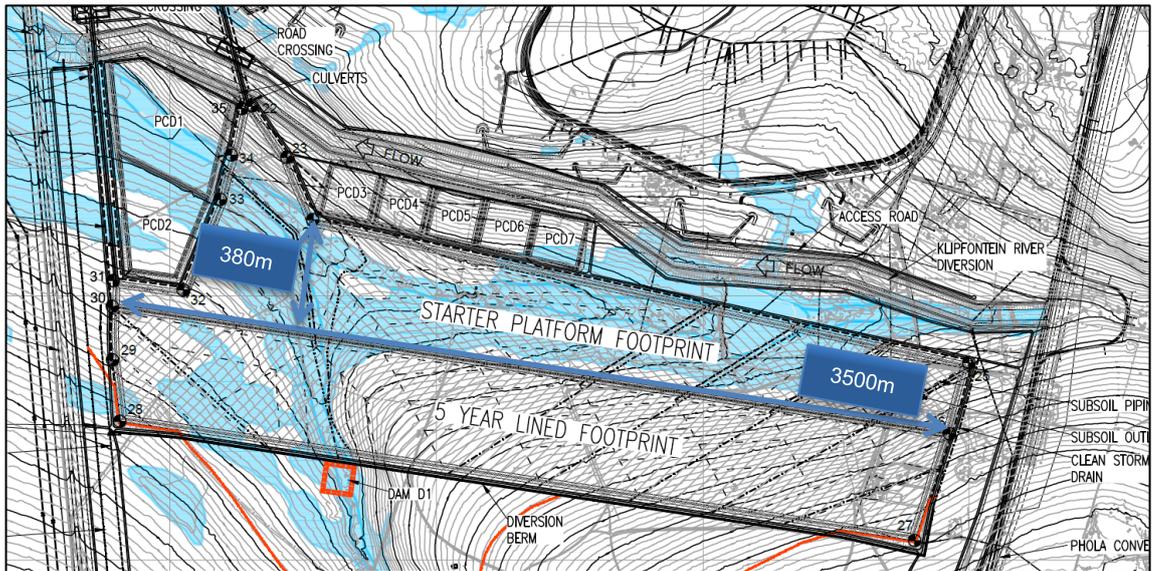


Figure 1: Site Layout

A river diversion will also be required for the Klipfontein Spruit River which is located along the northern side of the site.



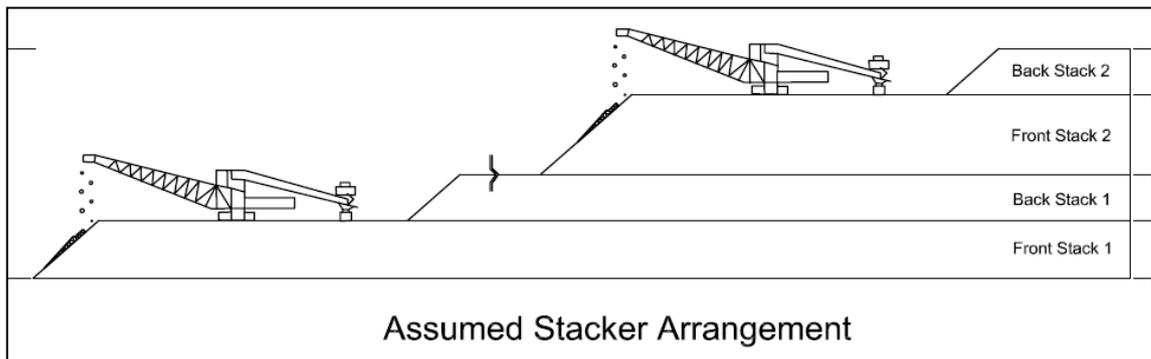
**Figure 2: Starter Platform and 5 year area footprints**

The lined starter platform has a storage capacity of 5 years and has the following dimensions:

- Length: 3 500m
- Width: 380m
- Footprint area: 120.5ha
- Maximum Height: 70m
- Volume: 35.8 million cubic meters

The lined ash facility has a storage capacity of 55 years and has the following dimensions:

- Length: 3 350m
- Width: 2 825m
- Footprint area: 696.6ha
- Height (shown conceptually in Figure 3):
  - The bottom stacker front stack: 5m thick
  - The bottom stacker back stack: 12m thick
  - The top stacker front stack: Varies from a minimum of 30m to a maximum of 94m thick. The average thickness is 51.6m.
  - The top stacker back stack: 12m thick



**Figure 3: Multi Stacker Philosophy**

- Volume:
  - 113.6 million cubic meters in the Bottom Stack (Volume Split: 23% of Total);
  - 385.3 million cubic meters in the Top Stack (Volume Split: 77% of Total).

The design of the ash facility is fully described in the Detailed Concept Design Report [Report JW-140].

#### 2.1.1 General information on the Ash Disposal Facility

- Access into the facility will be controlled by means of a security fence with only one access point which will be armed with security guards;
- The ash will be transferred from the power station to the facility by an overland conveyor. The conveyor will need to cross the Klipfontein Spruit River diversion.
- A road is to be constructed next to the conveyor to act as a maintenance access road, as well as a haul road for trucks to carry out emergency ash transportation in the case that conveyor maintenance and repair is required.
- An emergency ashing platform will be located at the end of each conveyor. The emergency platform will consist of a retaining wall and a supporting concrete slab. These platforms will be used at times when the conveyors are being maintained or repaired.
- The ADF: a landfill where only ash is to be deposited. This will be a Class C lined facility in terms of the National Norms and Standards for the Assessment of Waste for Landfill Disposal [2013] (as the ash classifies as a Type 3 waste).
- The leachate collection system in the basin of the ADF will consist of a 300 mm drainage layer of site sand, which will drain towards perforated HDPE pipes surrounded by drainage media.
- The groundwater control system is a replica of the leachate collection system below the liner system.
- Clean water will be diverted around the ADF with trenches and discharged via a stilling basin to the Klipfontein Spruit River.
- Seven Pollution Control Dams (PCDs) will serve the facility from the commencement of construction of the Starter Platform until the end of the facility's 60 year life. The PCDs are located on the northern side of the facility.

- The site facilities at the ash facility will include a plant maintenance workshop and offices. Storage at these facilities will include equipment spare parts, tools and maintenance & cleaning fluids and chemicals.

## 2.2 Organisational structure and responsibilities

The Kusile organisational structure is outlined in Figure 4. The roles and responsibilities for emergency responses are indicated in Table 1. This list is attached in Appendix A so that it can be continuously updated with the names and contact details whenever new appointments are made.

**Table 1: Roles and responsibilities for persons involved in emergency procedures**

Designation	Name	Contact details	Responsibility
<b>First person at the scene of an emergency</b>	<i>Not applicable</i>	<i>Not applicable</i>	<ul style="list-style-type: none"> <li>- Assess the extent of the emergency and report the required information regarding the incident to their Kusile Power Station Operation Shift Supervisor;</li> <li>- Activate the emergency response system by contacting the Kusile Power Station Operations Shift Supervisor and/or the relevant persons as per the Emergency Response List and, if qualified to do so, render first aid;</li> <li>- Make the area safe, for himself, people that are injured and bystanders;</li> <li>- Ensure that the injured person is not moved unless there is a danger to his/her life (<b>Life over Limb</b>).</li> </ul>
<b>Kusile Power Station Operation Shift Supervisor</b>	<i>To be confirmed</i>	<i>To be confirmed</i>	<ul style="list-style-type: none"> <li>- Take control over the emergency situation until the respective assistance arrives on the scene i.e. First Aider, etc.;</li> <li>- Relay the required information (as received from the first person) to the Paramedic and Kusile Power Station Health Safety Environment and Community Specialist;</li> <li>- Inform contractor management of incident;</li> <li>- Ensure the area is secured and made safe.</li> </ul>
<b>Paramedic</b>	<i>To be confirmed</i>	<i>To be confirmed</i>	<ul style="list-style-type: none"> <li>- Ensure scene, self and patient safety;</li> <li>- Ensure and request appropriate Emergency Medical Services (EMS) resources are dispatched;</li> <li>- Assist and stabilise patient/s according to relevant protocols;</li> <li>- Communicate the nature and severity of the incident to the Kusile Power Station Plant Manager and/or other agencies, if necessary;</li> <li>- If the injured person needs transportation to hospital, inform the Emergency Services Coordinator;</li> <li>- Ensure effective, timeous response and treatment by external services and follow up at receiving hospital about condition and status of the patient;</li> <li>- Ensure external services are escorted to the scene within Kusile Power Station property.</li> </ul>
<b>Kusile Power Station HSEC Specialist or Safety Officer on duty</b>	<i>To be confirmed</i>	<i>To be confirmed</i>	<ul style="list-style-type: none"> <li>- Assist Paramedic, where possible;</li> <li>- Ensure scene safety;</li> <li>- Initiate preliminary investigation with contractor management, i.e., assist in completing required form;</li> </ul>



Designation	Name	Contact details	Responsibility
			- Contact Kusile Power Station HSEC Officer.
<b>Kusile Power Station HSEC Officer</b>	<i>To be confirmed</i>	<i>To be confirmed</i>	<ul style="list-style-type: none"> <li>- Ensure that the External Service Providers (ESP) who may be required, are met at a predetermined entry point and escorted to the scene of the incident;</li> <li>- Inform Kusile Power Station Plant Manager of incident, as appropriate.</li> </ul>



# Eskom Kusile Organisation Structure Chart

**Figure 4: Organisational structure for the Kusile Power Station**

## 2.3 Hazard analysis

The following hazards could occur at the Ash Disposal Facility:

- Fires: structural fires, diesel fuel oil fires, electrical fires, veld fires, vehicle and machine fires;
- Chemical exposure: liquids and gasses
- Spillage:
  - Raw water from supply pipeline and/or wastewater from pipeline and pollution control dams;
  - Ash during transport to or from unloading points to storage piles or Ash Disposal Facility;
  - Diesel fuel oil/chemicals.
- Injury on site: personal injury accidents and motor vehicle collisions;
- General equipment failure at the ADF including stacker and conveyor break downs;
- Ash Disposal Facility or pollution control dam liner failure causing the release of leachate into the ground;
- Critical auxiliary equipment failures;
- Power outages resulting in property damage or resulting in a situation that endangers the life of employees;
- Bomb threats;
- Crime, resulting in theft, damage to property and loss to life;
- Building structure collapse;
- Drowning in PCD (deep still water)
- Drowning in river diversion (flowing shallow water);
- Ash slope stability failure.

## 3. **PREVENTION**

A number of actions can be undertaken to eliminate or minimize hazards.

### 3.1 **General housekeeping**

Overall, good general housekeeping should be observed and practiced at all times at the Ash Disposal Facility. Office corridors, access roads and all entry/exist points should be kept clear of obstructions.

Aim: Decrease the probability of vehicle or personal accidents.

Chemicals should be stored in suitable storage containers and containment areas, clearly marked and locked as required. Incompatible chemicals, such as acids and bases, should not be stored together. Chemicals should be stored in well ventilated storage facilities.

Aim: Decrease the probability of exposure to chemicals.

### 3.2 Fire prevention and fire extinguishers

Fire extinguishers and other firefighting equipment should be clearly visible and accessible. All personnel should receive training on the correct use of this equipment. All equipment should be inspected, serviced and tested according to the manufacturer's specification or relevant standards. The correct fire extinguishers for the various types of fires that can be encountered should be available on site.

Aim: Decrease the probability of fires and fire damage on site.

### 3.3 Storage of Materials

- Any chemicals and materials stored on site should be clearly labelled and copies of the Safety Data Sheets should be available on file. Safety Data Sheets to be developed in accordance with SANS 10234.
- All chemicals and materials should be stored in suitable storage containers and in well ventilated storage areas according to their characteristics, e.g., flammability, corrosivity, etc.;
- Incompatible chemicals should be stored separately;
- The appropriate SANS standard must be adhered to.

Aim: Decrease the probability of exposure to chemicals.

### 3.4 Spillage

#### 3.4.1 Raw water/waste water spillage

The pumping station, pipelines, storage tanks and pollution control dam facilities should be operated according to the industry accepted practices and procedures to ensure spillage is minimised and/or can be prevented, and that adequate freeboard exists. The pumping station, pipelines, storage tanks and pollution control dam facilities should be inspected regularly to ensure they are in good working conditions, and leaks should be repaired as soon as they are observed.

#### 3.4.2 Ash spillage

The ash handling facilities should be operated according to the industry accepted practices and procedures to ensure spillage is minimised and/or can be prevented. The ash is to be moisture conditioned to improve its handling properties. The conveyor belts and transfer houses used for the transportation of the ash should not be overloaded and should be appropriately covered or enclosed as required. The handling facilities should be inspected regularly by qualified personnel to ensure they are in good working conditions. Spillage should be removed from roads or other areas immediately after it has been observed and the area secured as required.

#### 3.4.3 Diesel fuel oil/chemical spillage

Storage and transport of diesel fuel oil/chemicals should be done according to the Safety Data Sheets (also refer to section 3.3 above). Hydrocarbon spillage containment and clean-up kits should be available on-site at all times. The loading/unloading equipment, storage containers/tanks, and/or the associated delivery infrastructure should be inspected regularly by qualified personnel to ensure they are in good working conditions.



Aim: Decrease the probability of spilling of waste water, ash or fuel.

### **3.5 Critical auxiliary equipment failures**

Critical auxiliary equipment should be installed, operated, maintained and tested according to the manufacturer's specifications or appropriate industry standards to limit incidents associated with mechanical failures. Regular inspections should be done on critical auxiliary equipment. The required spare parts must be available at the power station at all times.

Aim: Decrease the probability of failure of critical auxiliary equipment.

### **3.6 Liner failure**

The liners of the pollution control dams and the Ash Disposal Facility should be installed according to internationally accepted standards and the quality must be assured. Appropriate quality control measures should be implemented during installation. Activities (e.g. movement of vehicles), which could result in damage to the exposed sections should be prevented.

A fire break must be maintained around the exposed liner to prevent fire damage during veld fires. The break must be cleared at least once a year during autumn. Long grass should be removed from areas adjacent to anchor trenches to prevent fire damage.

Aim: Decrease the probability of liner failure.

### **3.7 Injury on site**

All personnel (including contractors) and visitors should wear appropriate personal protective equipment and clothing according to the expected risks or exposure associated with the area visited and the activities carried out.

All personnel (including contractors) and visitors should be made aware of the risks and the preventative measures to limit the likelihood of an emergency taking place. This would therefore require a suitable induction course.

Aim: Decrease the probability of personal accidents.

### **3.8 Bomb threats and crimes**

Sufficient security personnel should be stationed at all times at the main entrances/exits at the Ash Disposal Facility. All personnel and contractors should be required to visibly wear identification badges at all times. Only visitors with official business at the facilities be allowed access and must be accompanied by the facility personnel at all times.

Aim: Decrease the probability of crime and bomb threats.

### **3.9 Stacker break down**

Each of the stackers should be designed and constructed in accordance with internationally accepted industry standards. Stacker maintenance should be performed in accordance with accepted industry practices and standards. Regular stacker inspections should be conducted to detect any critical damage or preventative repairs that would need to be performed.

Aim: Decrease the probability of a stacker break down.



### 3.10 Building structure collapse

All building infrastructure should be designed and constructed in accordance with internationally accepted industry standards. Building maintenance should be performed in accordance with accepted industry practices and standards. Regular building inspections should be conducted to detect any critical damage or preventative repairs that would need to be performed.

Aim: Decrease the probability of building structure collapse.

### 3.11 Drowning in PCD

Hazard signs are to be installed at PCDs to indicate that the water is contaminated. Safety ropes are to be installed on the side slopes in order to assist someone falling in to climb out of the dam. -

Railing is to be installed on the sides of PCDs and large stormwater canals.

Aim: Decrease the probability of a person drowning in a PCD.

### 3.12 Ash stack stability

As the ash is placed at its angle of repose (30°) there is a low risk of a large scale stability failure. The scale of slippage will likely be local and can be repaired by the facility operations team.

The sides of the facility (other than the advancing face) are rehabilitated from the angle of repose to an angle of 11.3° (slope 1[v]:5[h]). After rehabilitation, the probability of slope failure is significantly reduced.

The strength of the ash will decrease if it becomes saturated. Therefore any action that causes a build-up of water within the ash stack will serve to decrease the global stability.

The toe of the advancing face must be constantly monitored for seepage which may occur due to over wetting during dust suppression or irrigation. It may also be an indicator that the leachate collection drainage layer above the lining system has been compromised. This may be indicated by a reduction of outflow of the drainage layer's HDPE pipe network.

Tension cracks may also form at the crest of the slope which may indicate failure will occur shortly. Therefore the crest of the slope needs to be constantly monitored for tensile cracks developing.

Aim: Decrease the probability of slope stability failure.

## 4. **PREPAREDNESS**

This section provides a description of the activities, which should be implemented in advance, to ensure that the emergency response plan is executed efficiently.

### 4.1 **Emergency contact information**

A list of emergency contact numbers should be readily available and clearly visible at various points at the facility. This should include (but not limited) to the following:

- Paramedic;
- Kusile Power Station HSEC Specialist or Safety Officer on duty;
- Kusile Power Station HSEC Officer;
- Kusile Power Station Operation Shift Supervisors;
- Kusile Power Station Plant Manager;
- Kusile Power Station Emergency Services Coordinator;
- Security;
- South African Police Service;
- Fire Department (Municipality);
- Ambulance/Emergency Response;
- Department of Water Affairs: Bronkhorstspuit
- Department of Environmental Affairs: Pretoria

The emergency numbers should be circulated during safety inductions.

### 4.2 **Inventory and maintenance of emergency equipment**

Emergency equipment should be maintained and checked regularly to ensure that it is in a working condition according to the maintenance schedule. Essential equipment such as first aid kits, flashlights and batteries, fire extinguishers and portable spill kits should be accessible at all times.

Ensure that the designated person(s) knows how the equipment should be operated.

A list of all emergency equipment shall be kept and maintained in good order by the subordinate manager in each area.

### 4.3 **Safe working procedures**

Safe working procedures (or SWP's) should be developed for circumstances where work will be carried out under hazardous conditions. These should be updated if a procedural, equipment or hazard change occurs. If no changes are made, the documents should be reviewed once per annum.

Generally known hazardous conditions/scenarios:

- Working at heights (falls);
- Working with machinery during maintenance of the stackers and conveyors;
- Working in confined spaces during cleaning of storm water transfer boxes / culverts;



- Working in noisy environments (near machinery);
- Working in dusty environments;
- Working in high temperatures where there is a risk of heat stroke, exhaustion or dehydration;
- Working in the pollution control dams where there is a risk of drowning.

#### 4.4 Training Requirements

Personnel responsible for dealing with emergency situations should be trained to understand their roles and responsibilities and be familiar with the emergency response systems and processes. The minimum skill competency and training required is indicated in Table 2:

**Table 2: Minimum skills level and training requirements**

Personnel	Minimum level of skills required and training needs
<b>Paramedic</b>	<ul style="list-style-type: none"> <li>• Level of training from Basic, Intermediate and Advanced Life Support;</li> <li>• Registration with the Health Professionals Council of South Africa is mandatory;</li> <li>• Skills maintenance at a recognized emergency service and Continuous Development Points must be up to date.</li> </ul>
<b>First Aider</b>	Valid Level 1 First Aid certificate from a registered and reputable training provider.
<b>Fire Team Member</b>	Competent to inspect and utilize a fire extinguisher to fight a controllable fire.
<b>Emergency Response Members</b>	Refresher training in the form of drills and discussions to keep skills updated. Members can be trained by the Paramedic and/or their responsible line manager.

#### 4.5 Emergency assembly point

Suitable emergency assembly point(s) must be identified and the area should be clearly marked. All site personnel and visitors should be made aware of its location(s).

#### 4.6 Emergency drills

Emergency drills shall be carried out on a quarterly basis and recorded in writing.

#### 4.7 Emergency Ashing Platform

If one or both stackers are out of commission, ash will temporarily be offloaded onto either of two emergency ash platforms situated at the end of each of the overland conveyors.

The overland conveyors are connected to a moving head system which can extend past the transfer point and deposit ash onto the emergency platform. The extended length is supported by a reinforced concrete wall which also retains the ash until it can be moved by mobile equipment.

The ash is transferred onto the extendable conveyor with the use of plant (e.g. a small bobcat type loader).

## 5. **RESPONSE**

The actions to be executed immediately upon occurrence, during, and after an emergency/disaster are outlined in this section.

### 5.1 **Vehicle accident**

The first person at the scene must assess the situation and report the accident information to his/her supervisor. This person should furthermore:

- Administer first aid as may be required. Do not move seriously injured person(s);
- Show the Paramedic and other emergency personnel to the injured person(s) upon their arrival;
- Address any spills according to a Waste/Chemical spill procedure.

### 5.2 **Fire**

The first person at the scene must assess the situation and report the following information to his/her supervisor:

- State that there is a fire and provide details on the location thereof;
- Type and size of the fire (dust, building, grass, electrical, chemical, equipment etc.);
- Direction of the fire;
- Property / equipment that can be damaged by the fire;
- Whether or not there is electricity involved and if it has been switched off;
- Follow procedure outlined in Table 1.

Take the following measures to make the area safe:

- Sound the alarm: radio the supervisor or use cell phone, alert other personnel working in the vicinity;
- Evacuate persons and machinery to a safe place if possible;
- Contact Fire and Rescue Services i.e. Municipal Fire Department;
- Take roll call when possible;
- If the fire is started due to electrically powered equipment, switch off the power supply immediately, if possible;
- Combat the fire with apparatus immediately available, and only if it is safe to do so;
- Determine the size of the fire, if the fire is too big to extinguish with a portable fire extinguisher within 1 – 2 minutes, evacuate the area as soon and as quickly as possible;
- Use correct equipment to extinguish fires, e.g.:
  - Paper, wood : Dry chemical extinguisher or water hose;
  - Flammable liquids : Dry chemical extinguisher or carbon dioxide;
  - Electrical fire : Carbon dioxide.



- Determine whether the fire will block exit points. Evacuate, if exit points are in close proximity to the fire;
- Never underestimate fires;
- Remember: Never turn your back on a fire;
- Avoid breathing smoke or potentially hazardous vapours;
- Go to emergency assembly point.

### 5.3 Waste/chemical spill

- Evaluate the waste/chemical spill in order to determine whether it is a major or minor spill. A major spill is defined as the following:

<i>Hydrocarbon (e.g. diesel fuel oil)</i>	:	> 1,000 litres
<i>Chemical</i>	:	> 100 litres
<i>Contaminated water</i>	:	> 10,000 litres.

- In the case of a minor spill:
  - Wear appropriate Personal Protective Equipment, if required;
  - Inform other personnel of the incident;
  - Stay up-wind;
  - Confine the spill as much as possible using sand, sawdust or other suitable absorbent material;
  - Use an appropriate, portable spill kit to clean up;
  - If necessary, vacate the immediate area;
  - Collect waste and treat or dispose of at appropriate facility.
- In the case of a major spill:
  - Wear appropriate Personal Protective Equipment as required;
  - Inform other personnel of the incident;
  - Stay up-wind;
  - Avoid contact with material and evacuate people in immediate area, if necessary;
  - Security department to demarcate the area with barrier tape (barrier net) where the substance was spilled (ensure that the person demarcating the area performs this task upwind of the spill to prevent contact with vapours);
  - Report to the Environmental Specialist who will contact a qualified Environmental Emergency Response Team aligned with Eskom standards and who will be contracted to clean the area, ensure the area is isolated and prevent further pollution. Report the following:
    - Type of incident that took place (e.g. spill);
    - Location of the incident (state clearly whether it occurred near a watercourse and if so, state the watercourse which will be affected);
    - Severity of the incident;
    - Possible environmental impact of the incident;



- Personnel and property/equipment in danger;
  - Substance spilled (identify the substance via the packaging label or Safety Data Sheet);
  - Quantity of substance spilled;
  - Size of the spill and equipment required for cleaning or containing the spill;
  - Prevailing wind direction;
  - Determine the substance's hazard to humans and the correct disposal methods from the Safety Data Sheet.
- The Health, Safety and Environmental Manager shall designate a person from the Kusile Power Station to take photos. Sampling equipment should be taken on site to analyse the effect of pollution on the environment.
  - The Health, Safety and Environmental Manager, after consultation with the Kusile Power Station Plant Manager, shall communicate incident information to relevant organisations.
  - Report the incident to the Department of Water Affairs and the Department of Environmental Affairs in the case that water pollution and or environmental damage has been caused.
  - Report the incident to the Police Services in the case that large scale evacuation or regional warnings need to be given.

#### **5.4 Personal injury**

- All personal injuries, no matter how minor, that occur on the Ash Disposal Facility must be reported to the Paramedic who in turn will inform the Kusile Power Station Plant Manager;
- The Paramedic will decide on further action:
  - Assess the injured himself before sending him to the clinic/hospital, dependent on severity of injury and mechanisms involved in the injury;
  - Give permission for the injured to be taken directly to the clinic;
- All persons injured on duty must be assessed by a Medical Practitioner;
- If the injured person is transported to hospital and/or admitted for further specialist treatment, the employer must ensure that he/she is fetched upon discharge and brought to the clinic the next working day. This is to ensure that he/she has been evaluated by the appointed doctor at the clinic prior to resuming work;
- All documentation regarding the injury should be forwarded to Kusile Power Station HSEC department for record purposes.

#### **5.5 Raw water/wastewater spillage**

- Wear appropriate Personal Protective Equipment;
- Confine the spill as much as possible using sand or other suitable absorbent material;
- Pump any material back into the containment dams;



- Investigate the extent of contamination and institute appropriate remediation actions;
- Investigate the cause of the spillage and take corrective action to prevent a similar spillage.
- Report the incident to the Department of Water Affairs and the Department of Environmental Affairs in the case that water pollution and or environmental damage has been caused

## 5.6 Bomb threats

All bomb threats or other threatening calls received should be taken seriously. Do not ignore this potentially hazardous situation. The staff member who receives the call should remain calm and should, if possible, direct the caller to the responsible line manager. A decision must then be made on whether or not to evacuate the premises. Considerations should include:

- Accessibility to actual intruders;
- Terminology used in the bomb threat;
- Time of day;
- An awareness of current events;
- Logistical problems of evacuation;
- Means by which the threat was communicated (mail, hand delivery, or phone);
- Advice of the police.

If evacuation is necessary, sound the fire alarm and follow the pre-established evacuation plan. Wait for the Police Services to conduct a thorough bomb search and deem the building/area safe before re-entering.

Follow a similar procedure to the above if a suspicious package is discovered.

During evacuation:

- Take personal belongings, like briefcases, handbags and lunches with to Emergency Assembly Point;
- Employees who have a visitor with him/her, are responsible for them;
- Evacuate in a neat and orderly fashion, proceed as indicated by the safety or fire marshals. DO NOT RUN;
- Remain calm and do not panic;
- All employees and visitors to gather at the Emergency Assembly Point(s);
- Roll call must be taken by the Fire Coordinator;
- Remember: disabled persons will come in last and go out first.

## 5.7 Drowning in PCD or Storm Water canal

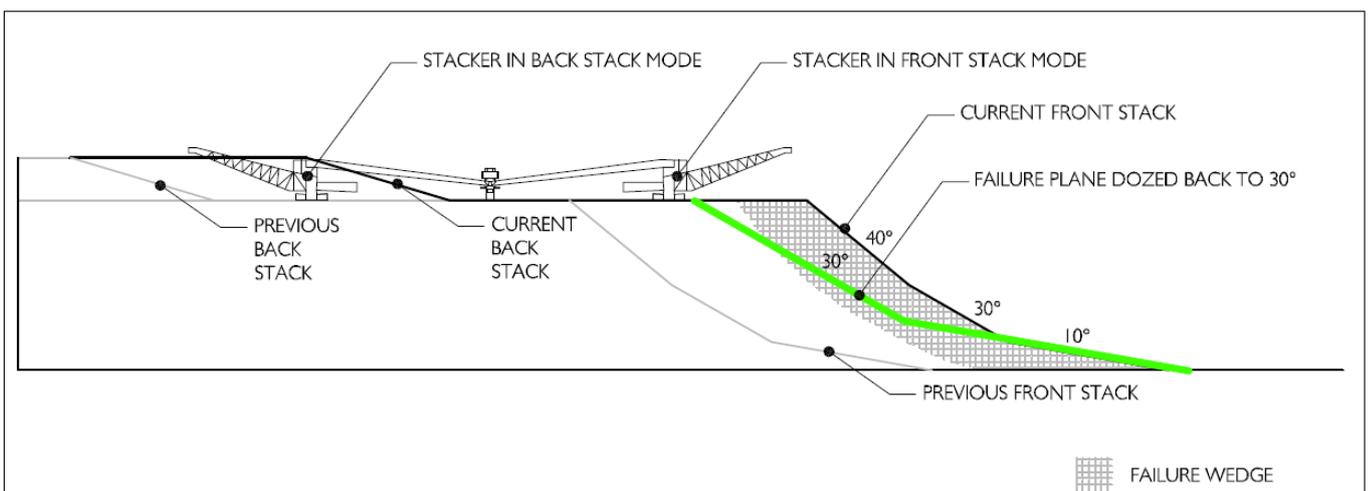
- If person is conscious throw a buoy out to them to assist them to float to a sidewall where safety ropes will be installed. Assist person to climb out of dam.
- If person is not conscious follow actions as stated in Table 1.



- Report incident to the Paramedic who in turn will inform the Kusile Power Station Plant Manager;
- The Paramedic will decide on further action:
  - Assess the injured himself before sending him to the clinic/hospital, dependent on severity of injury and mechanisms involved in the injury;
  - Give permission for the injured to be taken directly to the clinic;
- All persons injured on duty must be assessed by a Medical Practitioner;
- If the injured person is transported to hospital and/or admitted for further specialist treatment, the employer must ensure that he/she is fetched upon discharge and brought to the clinic the next working day. This is to ensure that he/she has been evaluated by the appointed doctor at the clinic prior to resuming work;
- All documentation regarding the injury should be forwarded to Kusile Power Station HSEC department for record purposes.

## 5.8 Ash stack stability failure

- Tension cracks that develop at the crest of the front stack may be an indication of slope instability.
- If cracks are evident, notify the Kusile Power Station Operation Shift Supervisor;
- Stop the ashing process in the area and have the stacker move to a safer location;
- Monitor the tensile cracks to see if they become larger and monitor the slope for further movement.
- If no further movement occurs, a call must be made by the resident or other Eskom professional engineer on whether to resume normal operations or if the slope must be cut back to a more gentle slope.
- If failure occurs, the slope of the remaining ash body will be circular in shape due to the cohesive nature of the ash as shown in Figure 5. The steep part of the curve near the crest will need to be dozed downwards until the angle of repose ( $30^\circ$ ) is achieved. The material that has slid will likely form a gentle slope of approximately  $10^\circ$  which is consistent with current ashing operations where small slippages occur. After reshaping the slip plane, normal operations can resume.



## Figure 5: Circular failure of ash resulting from its cohesive nature

### 5.9 Stacker Structure Failure

Stackers are constructed from steel sections which form frames which structurally interact with each other. Therefore structural failure of a stacker is possible, however, unlikely.

Stackers are to be regularly maintained so that there is less probability that a failure will occur. If a failure occurs, and one stacker is not operating, it places a large strain on the remaining stacker as well as the operations team. If both stackers are out of operation, the station cannot place ash and emergency procedures such as storing ash at emergency storage points and trucking the ash to the ADF will need to commence. If these procedures are also not possible, the power station may need to go offline placing immense strain on the national power grid.

Therefore it is imperative that the stackers are thoroughly maintained.

### 5.10 Building Structure Failure

The first person at the scene must assess the situation and report the following information to his/her supervisor:

- State that there is a building structure failure and provide details on the location thereof;
- Type and size of the failure (cracking, settlement);
- Property that can be damaged if the situation worsens;

Take the following measures to make the area safe:

- Evacuate persons and machinery to a safe place if possible;
- Take roll call when possible;
- Go to emergency assembly point;
- For personal injury refer to Section 5.4.

### 5.11 Liner Failure prior to ash deposition

The first person at the scene must assess the situation and report the following information to his/her supervisor:

- State that there is damage to the lining system and provide details on the location thereof;
- Type and size of the damage (liner puncture, crack, tear, removal of cover material, fire damage);
- Repairs, other than replacement of cover material, will need to be carried out by a specialist.

### 5.12 Critical auxiliary equipment

The first person at the scene must assess the situation and report the following information to his/her supervisor:

- State that there is a failure of critical auxiliary equipment and provide details on the location thereof;
- Type and size of the failure (provide specifics of equipment and mode of failure).

### 5.13 Power Outages

The first person at the scene must assess the situation and report the following information to his/her supervisor:

- State that a power outage has occurred and state if damage has taken place. Provide details on the location thereof;

Take the following measures to make the area safe:

- Evacuate persons and machinery to a safe place if possible;
- Take roll call when possible;
- Go to emergency assembly point;
- For personal injury refer to Section 5.4.

### 5.14 Crime

The first person at the scene must assess the situation and report the following information to his/her supervisor:

- State that there has been a criminal incident and provide details on the location thereof;
- Provide nature of crime (theft, assault or murder);

Take the following measures to make the area safe:

- Alert other personnel working in the vicinity;
- Go to emergency assembly point;
- Take roll call when possible;
- For personal injury refer to Section 5.4.

## 6. RECOVERY

This section describes the actions required to re-establish the facility back to its pre-emergency status.

### 6.1 Assessment of extent of damage

A suitably qualified person should assess the damage after the emergency to determine the extent of damage, and should propose corrective actions to remediate damages and impacts.

### 6.2 Remediation

Any remediation measures that are implemented should be conducted under the supervision of a suitably qualified person. Remediation should include measure to prevent the incident from recurring (where possible).

### 6.3 Incident communication / reporting

Only the Environmental Specialist, after consultation with the Kusile Power Station Plant Manager, shall communicate incident information to government bodies, downstream users and/or affected parties if necessary.

A major spill shall be reported to Kusile Power Station Management within 48 hours of the incident on the HSEC Significant Incident Report.

Any incident or accident in which a substance pollutes or has the potential to pollute a water resource or have a detrimental effect on a water resource, shall be reported to the:

- Department of Water Affairs;
- South African Police Services (SAPS);
- Relevant fire department; and
- Relevant Catchment Management Agency (CMA).

Any major incident such as spillage, fire, emissions, which may lead to danger to the public or environment shall be reported to:

- National Departments: Department of Mineral Resources, Department of Water Affairs and Department of Environmental Affairs;
- SAPS and Fire Protection Service;
- Provincial Department or municipality; and
- All persons whose health may be affected.

The report shall include:

- The nature of the incident, date of incident reported, immediate actions taken;
- Risks posed to public health, safety and property;
- Toxicity of the substances or by-products released;
- Steps taken to address the emergency;
- Steps to avoid/minimise effects on public health and the environment.

Within 14 days, a further report shall be submitted to the national Department of Environmental Affairs, provincial departments (head of department) and municipality to enable an initial evaluation of the incident. This report should include:

- Nature of incident; date of incident report, immediate actions taken;
- Substances involved, estimation of the quantities released and their possible acute effect on persons and the environment and data needed to assess the effects;
- Initial measures to minimize impacts;
- Cause of incident whether direct or indirect, including equipment, technology, system or management failure; and
- Avoidance measures taken or to be taken.

#### 6.4 Record keeping

The Kusile Power Station HSEC Specialist shall keep the following records for the duration stated in Eskom's documentation retention policy:

- Emergency Response Drills (including copies of drills conducted by contractors);
- Incident reports regarding details of emergency situations;
- Action plans developed for the rectification of issues arising from emergency drills; and
- Any reports submitted to the DMR as per the legal requirements.

Copies of the above must be submitted to the Paramedic/Kusile Power Station Emergency Services Coordinator/Kusile Power Station HSEC Specialist.



Charl Cilliers  
Project Manager  
for Jones & Wagener



Danie Brink  
Project Director

4 June 2014

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**ZITHOLELE CONSULTING (PTY) LTD**

**KUSILE POWER STATION 60 YEAR ASH DISPOSAL FACILITY: WASTE MANAGEMENT  
FACILITY LICENCE APPLICATION REPORT**

**EMERGENCY PREPAREDNESS PLAN**

Report: JW009/14/D121 - Rev

## **APPENDIX A**

# **ORGANISATIONAL STRUCTURE AND RESPONSIBILITIES**



**Table 1: Roles and responsibilities for emergency procedure**

Designation	Name	Contact details	Responsibility
<b>First person at the scene of an emergency</b>	<i>Not applicable</i>	<i>Not applicable</i>	<ul style="list-style-type: none"> <li>- Assess the extent of the emergency and report the required information regarding the incident to their Kusile Power Station Operation Shift Supervisor;</li> <li>- Activate the emergency response system by contacting the Kusile Power Station Operations Shift Supervisor and/or the relevant persons as per the Emergency Response List and, if qualified to do so, render first aid;</li> <li>- Make the area safe, for himself, people that are injured and bystanders;</li> <li>- Ensure that the injured person is not moved unless there is a danger to his/her life <b>(Life over Limb)</b>.</li> </ul>
<b>Kusile Power Station Operation Shift Supervisor</b>	<i>To be confirmed</i>	<i>To be confirmed</i>	<ul style="list-style-type: none"> <li>- Take control over the emergency situation until the respective assistance arrives on the scene i.e. First Aider, etc.;</li> <li>- Relay the required information (as received from the first person) to the Paramedic and Kusile Power Station Health Safety Environment and Community Specialist;</li> <li>- Inform contractor management of incident;</li> <li>- Ensure the area is secured and made safe.</li> </ul>
<b>Paramedic</b>	<i>To be confirmed</i>	<i>To be confirmed</i>	<ul style="list-style-type: none"> <li>- Ensure scene, self and patient safety;</li> <li>- Ensure and request appropriate Emergency Medical Services (EMS) resources are dispatched;</li> <li>- Assist and stabilise patient/s according to relevant protocols;</li> <li>- Communicate the nature and severity of the incident to the Kusile Power Station Plant Manager and/or other agencies, if necessary;</li> <li>- If the injured person needs transportation to hospital, inform the Emergency Services Coordinator;</li> <li>- Ensure effective, timeous response and treatment by external services and follow up at receiving hospital about condition and status of the patient;</li> <li>- Ensure external services are escorted to the scene within Kusile Power Station property.</li> </ul>
<b>Kusile Power Station HSEC Specialist or Safety Officer on duty</b>	<i>To be confirmed</i>	<i>To be confirmed</i>	<ul style="list-style-type: none"> <li>- Assist Paramedic, where possible;</li> <li>- Ensure scene safety;</li> <li>- Initiate preliminary investigation with contractor management, i.e., assist in completing required form;</li> <li>- Contact Kusile Power Station HSEC Officer.</li> </ul>
<b>Kusile Power Station HSEC Officer</b>	<i>To be confirmed</i>	<i>To be confirmed</i>	<ul style="list-style-type: none"> <li>- Ensure that the External Service Providers (ESP) who may be required, are met at a predetermined entry point and escorted to the scene of the incident;</li> <li>- Inform Kusile Power Station Plant Manager of incident, as appropriate.</li> </ul>

<b>REPORT CHECKLIST</b>				Job no:	
				3 June, 2014	
				Our Ref:	Document1
ITEM	AUTHOR	REVIEWER	CORRECTED	COMMENTS	
<b>GENERAL</b>					
Report number registered					
Correct template					
<b>STRUCTURE</b>					
Document approval record				Author, review, revision etc.	
Revision / issue register					
Synopsis					
Table of contents					
References					
Sign and counter sign					
Appendices					
Drawings					
<b>CONTENT</b>					
Purpose					
Nature of the project					
Project information				Location, geology, topography	
Engineering basis				Design, codes, assumptions etc	
Analysis/Calculations/Review					
Discussions					
Recommendations					
Follow-up work required?					
Conclusions					
<b>REVIEW</b>					
Fulfils brief & purpose?	/				
Clarity?	/			Figures and tables?	
Supporting data complete?	/			Forest & trees covered?	
Recommendations logical?	/			Consistent with site conditions?	
Recommendations practical?	/			Practicality	
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