



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

### **RISK MANAGEMENT PLAN IN TERMS OF REGULATION 10 OF WASTE EXCLUSION REGULATIONS**

<b>APPLICANT</b>	ESKOM HOLDINGS SOC Ltd
<b>SOURCE(S) OF WASTE</b>	Eskom Coal fired Power Stations
<b>WASTE TO BE BENEFICIATED</b>	<p><u>Pulverised Fly Ash:</u></p> <p>Pulverised coal fired boiler ash is a term for ash generated within a power station electricity generation process and is derived from firing boilers with pulverised coal. The ash is taken from the boiler prior to conditioning. This is the type of ash that is being considered for beneficial use.</p> <p><u>Course Ash / Bottom Ash :</u></p> <p>Bottom ash is part of the non-combustible residue of combustion in a power station. It accumulates and is collected from the bottom of the boiler and has therefore not gone through a precipitator or filtering process.</p> <p><u>Clinker Ash:</u></p> <p>Clinker ash is obtained from a chain grate boiler process that was used in the older power stations. This ash forms larger clinkers that closely resemble stone formations.</p> <p><u>Run of Station Ash</u></p> <p>The practice of, under Station contingency, having to temporary dump quantities of fly ash in a designated area for later transportation to the ash dumps.</p> <p><u>Cenospheres</u></p> <p>Cenospheres are recovered from the surface of ash disposal ponds and are of similar chemical composition to ash. Due to a particle density of less than 1.0 kg/cm<sup>3</sup> they float on the water.</p>

<b>BENEFICIAL USE/S</b>	Cementitious - Cement, Brick and Block Making		
	Geopolymers - including all cast products, eg Paving, Poles, Curb stones		
	Filler Applications - including but not limited to Ceramics, Paint, Rubber, Glue		
	Zeolites production		
	Metal and Mineral extraction		
	Mineral fibre production		
<b>MSDS ATTACHED IF HAZARDOUS</b>	<b>YES</b> X	<b>NO</b>	
<b>WASTE GENERATING FACILITY</b>			
<b>PHYSICAL ADDRESS</b>	<b>POWER STATION NAME</b>	<b>COALFIELDS</b>	<b>Location</b>
	Arnot PS	Witbank	Rietkuil, 50km E of Middleburg
	Camden PS	Witbank	15km E of Ermelo
	Duvha PS	Witbank	15km E of Witbank
	Grootvlei PS	Witbank	Near Balfour in Mpumalanga
	Hendrina PS	Witbank	Pullenshope, 40km S Middleburg
	Kendal PS	Witbank	Near Ogies, 40km SW of Witbank
	Komati PS	Witbank	Komati, 37 km from Middleburg
	Kriel PS	Witbank	Between Kriel and Ogies
	Lethabo PS	Free State	Between Vereeniging and Sasolburg
	Majuba PS	Witbank	Between Volksrust and Amersfort
	Matimba PS	Waterburg	LepHalale
	Matla PS	Witbank	Between Kriel and Secunda
	Tutuka PS	Witbank	25km from Standerton road to Bethal
	Medupi PS (Partially	Waterburg	LepHalale

	operational)		
	Kusile PS (Partially operational)	Witbank	Nkangala district, Mpumalanga
	Kimberley BVV Clinker Dump	Kimberley	Blankenbergvlei Power Station
	Witbank Clinker Dump	Witbank	
<b>GPS CO-ORDINATES OF WASTE GENERATING FACILITY (e.g. 60° 29' 30" Latitude; 34° 20' 15" Longitude)</b>	<p><b><u>The co-ordinates of all Eskom Power Stations are included in an Appendix attached to this application.</u></b></p> <p><b>THE CO-ORDINATES REPRESENT "ALL CORNERS" OF THE WASTE GENERATION FACILITY AS REQUIRED BY THE APPLICATION. SEVERAL CO-ORDINATES ARE REQUIRED TO IDENTIFY THE IRREGULAR SHAPE OF ESKOM ASH GENERATING FACILITIES. THE CO-ORDINATES REPRESENT THE BOUNDARIES OF THE POWER STATION PROPERTY WHICH WOULD INCLUDE ALL POSSIBLE ASH TAKE OFF SITES</b></p>		
<b>POSTAL ADDRESS</b>	P. O. Box 1091, Johannesburg 2000		
<b>CONTACT PERSON</b>	Warren Funston		
<b>TELEPHONE</b>	011 800 - 4039	<b>CELL:</b>	
<b>EMAIL</b>	Warren.funston@eskom.co.za	<b>FAX:</b>	

## RISK MANAGEMENT PLAN

Activity	Risk Description	Action(s) to minimise/ manage the risk	Responsibility (Who is responsible to do it)
<b>Transport of Fly Ash.</b>	Dust generated in large quantities during the on and / or offloading might contaminate nearby natural botanical species and agricultural crops by settling on	Fly ash must be transported in tankers or sealed bins / containers.	Ash transporter and / or ash offtaker

	<p>the plant leaves, stems or flowers. In large quantities, ash dust might settle on water body surfaces and be ingested by aquatic vertebrates and invertebrates.</p> <p>Although ash has been shown to increase the pH of the soil, certain soils might be contaminated with large and continuous deposition of ash dust..</p>	<p>PPE in the form of dust masks and eye protection must be worn. Dust suppression should be carried out at point of load and unload of ash. Ash should be packaged in bags to minimise dust generation.</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	
<b>Transport of Bottom / course ash</b>	<p>Accidental spillages during loading and unloading of vehicles. Dust will be less of a factor in the handling of course / bottom ash. Spillages during the on and / or offloading might contaminate nearby natural botanical species and agricultural crops by settling on the plant leaves, stems or flowers.</p> <p>Although ash has been shown to increase the pH of the soil, certain soils might be contaminated with large and continuous deposition of ash spillage</p>	<p>All transport vehicles for course ash, bottom ash and run of station ash must have load bins and must be covered with a tightly fitted tarpaulin.</p> <p>All Ash should undergo dust suppression at point of loading. Vehicles must be serviced regularly and have their service records available. Vehicles should be checked for areas of potential spillage.</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	Ash transporter and / or ash offtaker
<b>Transport of all Ash</b>	<p>Spillage of ash or water containing ash from the transport vehicles on route to the ash users. Dust generated in large quantities during the on and / or offloading might contaminate</p>	<p>A pre start inspection of all vehicles should be completed periodically to ensure road worthiness.</p>	Ash transporter and / or ash offtaker

	<p>nearby natural botanical species and agricultural crops by settling on the plant leaves, stems or flowers.</p> <p>In large quantities, ash dust might settle on water body surfaces and be ingested by aquatic vertebrates and invertebrates.</p> <p>Although ash has been shown to increase the pH of the soil, certain soils might be contaminated with large and continuous deposition of ash dust.</p>	<p>Vehicles must comply to SABS 1518 "Transportation of dangerous goods" and have on board the MSDS for the ash being transported.</p> <p>Equipment for emergency events must be available on vehicles. Wheelie bins for example with berms, brooms and spades must be on the vehicle.</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	
<p><b>Transport of all Ash : Compliance of vehicle to Road traffic Act</b></p>	<p>Vehicles in poor condition or inadequate to transport ash will facilitate uncontrolled spillages of ash. Dust generated in large quantities during the on and / or offloading might contaminate nearby natural botanical species and agricultural crops by settling on the plant leaves, stems or flowers.</p> <p>In large quantities, ash dust might settle on water body surfaces and be ingested by aquatic vertebrates and invertebrates.</p> <p>Although ash has been shown to increase the pH of the soil, certain soils might be contaminated with large and continuous deposition of ash dust.</p>	<p>A pre start inspection of all vehicles should be completed periodically to ensure road worthiness.</p> <p>Vehicles must comply to SABS 1518 "Transportation of dangerous goods" and have on board the MSDS for the ash being transported.</p> <p>Equipment for emergency events must be available on vehicles</p> <p>Any spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too and cleaned as a matter of urgency (within 48 hours).</p>	<p>Ash transporter and / or ash offtaker</p>

		The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.	
<b>Storage of Ash</b>	<p>Soil contamination by ash stored at the user facility. Fresh Fly ash will be stored in tankers or closed bins / containers and it remains improbable that any contamination will occur.</p> <p>Ash spillages in liquid form could contaminate water bodies and be detrimental to vertebrate and invertebrate aquatic life. In extreme cases, natural vectors could convey contaminated water to groundwater aquifers. Although ash has been shown to increase the pH of the soil, certain soils might be contaminated ash spillages.</p>	<p>Fly ash to be stored in silos – Couse ash must be stored on a concrete surface which is bunded with bricked cement to a height effective to contain all the ash. Ash may only be stored on this lined and bunded area. All ash to be covered during storage.</p> <p>Clean and dirty water must be kept separate to limit contamination of water.</p> <p>Any spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too and cleaned as a matter of urgency (within 48 hours).</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	Ash transporter and / or ash offtaker
<b>Storage of Ash</b>	Groundwater contamination by ash stored at the user facility. Fresh Fly ash will be stored in tankers or closed bins / containers and it remains improbable that any contamination will occur	Ash must be stored on a concrete surface which is bunded with bricked cement to a height effective to contain all the ash. Ash may only be stored on this lined	Ash transporter and / or ash offtaker

	<p>Ash spillages in liquid form could contaminate water bodies and be detrimental to vertebrate and invertebrate aquatic life.</p> <p>In extreme cases, natural vectors could convey contaminated water to groundwater aquifers</p>	<p>and banded area. Clean and dirty water must be kept separate to limit contamination of water.</p> <p>Any large spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too and cleaned as a matter of urgency (within 48 hours).</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	
<b>Storage of Ash</b>	<p>Surface water contamination by ash storage at the user facility. Fresh Fly ash will be stored in tankers or closed bins / containers and it remains improbable that any contamination will occur</p> <p>Ash spillages in liquid form could contaminate water bodies and be detrimental to vertebrate and invertebrate aquatic life.</p> <p>In extreme cases, natural vectors could convey contaminated water to groundwater aquifers.</p>	<p>Fly ash must be stored in silo's or similar sealed containers.</p> <p>Any spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too and cleaned as a matter of urgency (within 48 hours).</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p> <p>Storage area to be inspected weekly to check integrity of the structure</p>	Ash transporter and / or ash offtaker
<b>Potential for stockpiled ash to</b>	Ash facilities with poorly constructed stormwater drain systems could discharge dirty	Ash to be stored in a formal storage area which is banded	Ash Offtaker

<p><b>generate leachate during rainfall</b></p>	<p>water to the environment.</p>	<p>Ensure physical separation of the dirty and clean stormwater drains.          Ensure construction of the facility directs all dirty stormwater drains to a containment area / pit or dam.          Storage area to be inspected weekly to check integrity of the structure</p>	
<p><b>Construction and design of an ash handling and/ or storage facility</b></p>	<p>Ash facilities which are poorly ventilated will cause possible health impacts. Poorly ventilated ash workplaces will likely result in health symptoms and skin and dermal irritations associated with ash particle ingestion.</p>	<p>All ash handling and storage facilities must be adequately ventilated and ash handlers issued with the appropriate PPE (particularly masks and gloves).           Contaminated water to be managed from leaving the site.           Any spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too and cleaned as a matter of urgency (within 48 hours).           The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	<p>Ash transporter and / or ash offtaker</p>
<p><b>Construction and design of an ash handling and/ or storage facility</b></p>	<p>Ash facilities close to natural water bodies will cause possible soil or water contamination. Spillage or dust blown particles if in large enough quantities, might contaminate natural and man-made surface water bodies.</p>	<p>On and off loading areas are required to be appropriately bunded and lined.          All contaminated water from vehicle washing and wheel washing</p>	<p>Ash transporter and / or ash offtaker</p>



		<p>must be contained.</p> <p>Any spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too and cleaned as a matter of urgency (within 48 hours).</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	
<b>Access Control to Ash facilities</b>	<p>Uncontrolled access to ash facilities will lead to non compliance to the controls of the Risk Management Plan. Unsupervised spillage or dust blown particles if in large enough quantities, might contaminate natural and man-made surface water bodies.</p>	<p>Relevant PPE must be worn by all employees when handling ash. Site access must be controlled and warning signs must be visible at the access point . Access to the ash facility as well as on and off loading areas must be controlled via a register, ledger or similar control mechanism.</p> <p>All ash handling and storage facilities must have adequate signage.</p>	<p>Ash transporter and / or ash offtaker</p>
<b>Handling of Ash on site / Extraction of Ash / On and off loading of Ash</b>	<p>Dust generated during loading and unloading of vehicles. Spillage of ash material or slurry. Dust generated in large quantities during the on and / or offloading might contaminate nearby natural botanical species and agricultural crops by settling on the plant leaves, stems or flowers.</p> <p>In large quantities, ash dust might settle on water body surfaces and be ingested by aquatic</p>	<p>Ash must only be handled within the lined and bunded area.</p> <p>Any spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too and cleaned as a matter of urgency (within 48 hours).</p>	<p>Ash transporter and / or ash offtaker</p>

	<p>vertebrates and invertebrates.</p> <p>Although ash has been shown to increase the pH of the soil, certain soils might be contaminated with large and continuous deposition of ash dust.</p>	<p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	
<b>Emergency or unplanned event</b>	<p>Loss of containment with potential impacts to air, soil, ground and surface water. In an emergency or unplanned event, dust generated in large quantities might contaminate nearby natural botanical species and agricultural crops by settling on the plant leaves, stems or flowers.</p> <p>In large quantities, ash dust might settle on water body surfaces and be ingested by aquatic vertebrates and invertebrates.</p> <p>Although ash has been shown to increase the pH of the soil, certain soils might be contaminated with large and continuous deposition of ash dust.</p>	<p>Site to have an emergency response plan in place inclusive of appropriate equipment such as control and clean up diversion berms.</p> <p>Any spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too and cleaned as a matter of urgency (within 48 hours).</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	<p>Ash transporter and / or ash offtaker</p>
<b>Storm water management</b>	<p>The inadequate management of stormwater on site will allow discharge of contaminated water to the environment. Ash contaminated effluent or stormwater if diverted into water bodies, may be harmful if ingested by aquatic vertebrates and invertebrates.</p>	<p>All dirty areas should be separated from clean water areas, where dirty storm water is collected within a dirty water dam for reuse as dust suppressant and for evaporation.</p> <p>Any spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too</p>	<p>Ash transporter and / or ash offtaker</p>

		<p>and cleaned as a matter of urgency (within 48 hours).</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	
<b>Leaching of ash elements</b>	<p>The chemical reaction of ash particles with natural elements in the surrounding soil and water could lead to the leaching of harmful metals into the environment. The leaching of harmful metals from ash will be toxic to all vertebrate and invertebrate life in the soil substrate and water bodies. The negative effect will likely be extended to the health of the soils and the botanical biodiversity of the area.</p>	<p>Ash is only prone to leaching in highly acidic environments. Any spillages of ash, dirty water or ash material must be reported to the Generator. Such spills must be attended too and cleaned as a matter of urgency (within 48 hours).</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	<p>Ash transporter and / or ash offtaker</p>
<b>Decommissioning of site</b>	<p>Without a decommissioning plan a non active site may lead to ash spillages or contamination of surrounding air, soil and water. In the scenario of an abandoned site, dust generated in large quantities might contaminate nearby natural botanical species and agricultural crops by settling on the plant leaves, stems or flowers.</p> <p>In large quantities, ash dust might settle on water body surfaces and cause harm if ingested by aquatic vertebrates and invertebrates.</p> <p>In severe cases, an abandoned site might eventually contaminate groundwater at the site.</p>	<p>Sites must have a plan associated for the decommissioning phase to ensure zero post operations impacts. Funds should be set aside for decommissioning during the life of the project.</p> <p>The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.</p>	<p>Ash transporter and / or ash offtaker</p>

	Although ash has been shown to increase the pH of the soil, certain soils might be contaminated with large and continuous deposition of ash dust.		
<b>CLINKER ASH: Spontaneous combustion</b>	The medium to long term storage of clinker ash potentially increases the likelihood of spontaneous combustion. The high carbon content of clinker ash in storage may smoulder and ignite. Any fire moving of the property will cause damage and loss to all terrestrial life including slow moving reptiles and mammals.	Should spontaneous combustion occur, the local fire Department must be contacted for assistance. Immediate actions must include covering the coal to prevent air ingress and flooding the area if possible.  The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.	Ash transporter and / or ash offtaker
<b>Harvesting of cenospheres</b>	Drowning or bodily injury by persons trying to harvest cenospheres from the water surface.	Employees should not harvest alone, but in teams or under supervision. If necessary, life jackets must be available and or life buoys.  The relevant tool box talks, capacity building and training of staff must be completed to raise awareness of the risks and response plans.	Ash transporter and / or ash offtaker
<b>SOCIO-ECONOMIC RISKS: Positive spin offs at risk should ash beneficiation not be possible:</b>			
<b>Job creation</b>	Increase in job creation for unskilled to semiskilled workforce in vulnerable communities.	This is a positive spin off of ash beneficiation and should be maximised.	Eskom and Department of Environmental Affairs

<p><b>Small business development</b></p>	<p>The low cost of ash and the relaxation of some of the Norms and Standards will promote small business development</p>	<p>This is a positive spin off of ash beneficiation and should be maximised.</p>	<p>Eskom and Department of Environmental Affairs</p>
<p><b>Community based projects</b></p>	<p>The low cost of ash and the relaxation of some of the Norms and Standards may empower vulnerable communities to participate in projects. Eskom assistance may also promote community based projects.</p>	<p>This is a positive spin off of ash beneficiation and should be maximised.</p>	<p>Eskom and Department of Environmental Affairs</p>

**DECLARATION**

I, W FUNSTON hereby declare that I have read the completed Risk Management form and hereby confirm that the information is to the best of my knowledge true and correct.

Furthermore, I declare that I am fully aware of my responsibilities in terms of the Waste Exclusion Regulations, and that failure to comply with these Regulations may constitute an offence in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008).

Applicant (Full names) WARREN FUNSTON

Designation : MANAGER: BIODIVERSITY AND WASTE

Signature



Date 20 September 2018

Place JHB

**FOR OFFICE USE ONLY**

Date Received				
Decision Taken	Authorised	Not authorised (provide reason)		
Reference Number				

# Material Safety Data sheet for fly ash and bottom ash

The categories of information supplied on this MSDS are as stipulated in SANS 10234 and SANS/ISO 11014

## Section 1: Product and company identification

**Product**                      Unclassified fly ash  
**Alternative names**    Pulverised fuel ash, PFA, Fly ash

### Physical appearance and description

**Fly ash:**                      Fly ash is a fine, grey comprised of mostly spherical glass particles produced in the combustion of pulverised coal in power station boilers. It has no odour.

**Bottom ash:**                Bottom ash is a similar product formed of larger particles, which are not released to the flue gas.

### Formulation

The basic alumina-silicate form is not altered in the handling process.

### Supplier/Manufacturer

Eskom Holdings SOC Ltd  
1 Maxwell Drive  
Sunninghill  
Sandton  
PO Box 1091  
Johannesburg  
2000

Arnot Power Station  
Camden Power Station  
Duvha Power Station  
Grootvlei Power Station  
Hendrina Power Station  
Kendal Power Station  
Komati Power Station  
Kriel Power Station  
Lethabo Power Station  
Majuba Power Station  
Matimba Power Station  
Matla Power Station  
Tutuka Power Station  
Medupi Power Station  
Kusile Power Station

## **Section 2: Composition/ingredients**

Fly ash is comprised of mostly silicon ( $\text{SiO}_2$ ) and aluminium oxides ( $\text{Al}_2\text{O}_3$ ) in the form of alumina-silicate amorphous spheres. It also contains minor amounts of iron ( $\text{Fe}_2\text{O}_3$ ), calcium (CaO), titanium ( $\text{TiO}_2$ ) and magnesium (MgO) oxides.

## **Section 3: Hazards Identification**

### **Identification**

Fly ash is a fine grey power that poses little immediate hazard. Short term exposure is not likely to cause harm. Labelling and classification complies with SANS 10234

NB – Fly ash is alkaline and if wet may irritate the skin.

Fly ash contains small amounts of crystalline silica. Any activity causing dust should be minimised.

**Carcinogen potential** – OHSA and IARC to not list fly ash as a carcinogen

### **Effects of eye contact**

Airborne dust may cause Immediate of delayed irritation and inflammation.

### **Effect of skin contact**

Fly ash may cause dry skin and irritation depending on the contact time.

### **Effect of inhalation**

Inhalation of the dust may cause irritation of the nose, throat and/or lungs depending on the degree of exposure.

### **Effect of ingestion**

Small quantities of fly ash are not known to be harmful. Large volumes will irritate the digestive tract.

## **Section 4: First aid measures**

### **Skin Contact**

Wash the affected area with soap and water. If any irritation occurs get medical attention.

### **Eye contact**

Flush the eyes with large amounts of water. If any irritation occurs get medical attention.

### **Inhalation**

Move the affected person to fresh air. If the nose or airways become inflamed get medical attention.

### **ingestion**

Do not induce vomiting. Rinse the mouth thoroughly with water and give the person water to drink. If any discomfort is experienced get medical attention.

## **Section 5: Fire and explosion hazard data**



**Flashpoint:**

**Non-flammable / Non explosive**

**Flammable (Explosive Limits % Vol):**

**Not applicable**

**Unusual Fire and Explosive Hazards:**

**None**

**Special Fire-fighting Procedures:**

**None**

**Section 6: Accidental release measures**

**Methods of cleaning**

Vacuum spilled material and place in a bag or container. Spray with a small amount of water to facilitate handling and minimise dust formation. Do not wash down drains.

**Environmental precautions**

Prevent fly ash from entering surface water (water course or dams)

**Section 7: Handling and storage**

**Handling**

Avoid accidental formation of ash dust. Vacuum any spills and dampen clean-up remains.

### **Storage**

Store dry in bags (preferably on pallets) or in containers or bulk silos

### **Engulfment hazard**

To prevent burial or suffocation do not enter any confined space that houses fly ash. Fly ash can adhere and build up on walls in a confined space.

## **Section 8: Exposure controls and Personal Protection**

### **Skin Protection**

Wear impervious clothing, boots and gloves and a barrier cream, if possible, to limit prolonged exposure to fly ash. Wash as soon as possible after any exposure.

### **Respiratory protection**

Use local or general ventilation to control exposure. Use suitable dust masks/respirators in poorly ventilated areas.

### **Eye Protection**

Wear safety glasses with side shields if there is a risk of dust formation during handling.

### **Ingestion**

Small amounts of fly ash are not known to be harmful.

### **Personal Protective Equipment (PPE)**

The following PPE is recommended when working with fly ash.



## **Section 9: Physical and chemical properties**

<b>Appearance:</b>	fine, grey powder
<b>Odour:</b>	No distinct odour
<b>pH:</b>	11.0 (>8 in water)
<b>Boiling point:</b>	Not applicable
<b>Melting point:</b>	Not applicable (>1250°C)
<b>Vapour density:</b>	Not applicable
<b>Flash point:</b>	Not applicable (non-volatile)

**Solubility in water:** Slightly

**Specific Gravity:** 2.0 – 2.5

**Chemical analyses:**

<b>Unclassified Fly ash</b>	
	<b>% Tested</b>
LOI	0.4 – 7.8
SiO <sub>2</sub>	50.6 – 60.0
Al <sub>2</sub> O <sub>3</sub>	25.3 – 33.3
Fe <sub>2</sub> O <sub>3</sub>	3.2 – 6.4
TiO <sub>2</sub>	1.5 – 1.9
P <sub>2</sub> O <sub>5</sub>	0.37 – 1.07
CaO	3.1 – 8.2
MgO	0.6 – 2.1
Na <sub>2</sub> O	0.1 – 0.9
K <sub>2</sub> O	0.6 – 1.0
SO <sub>3</sub>	0.2 – 1.2
MnO	0.01 – 0.03

## **Section 10: Stability and reactivity**

### **Stability:**

Stable under normal room temperature and conditions. No hazardous combustion decomposition products.

### **Reactivity**

Will form lumps with long term exposure to moisture.

Will react violently with bromine trifluoride, fluorine, hydrogen fluoride and phosphorous.

## **Section 11: Toxicological Information**

No toxicological disease or condition reported to date.

Inhalation of microsilica dust is considered to entail minimal risk of silicosis.

## **Section 12: Ecological Information**

Environmental effects are limited unless large quantities are involved.

### **Eco-toxicity:**

No recognised unusual toxicity to plants and animals

### **Aquatic toxicity:**

Non-toxic in low quantities. Large volumes will cause an increase in pH above 12, which will result in the death of aquatic life.

## **Section 13: Disposal considerations**

- There are no residues from using the product.
- Do not wash down drains
- Disposal in landfill suitable for building rubble or dispose on existing Eskom ash dumps (prior arrangement).

## **Section 14: Transport Information**

Fly ash is not considered hazardous for the purpose of transportation.

As fly ash (PFA) is not hazardous cargo it does not have a UN number.

## **Section 15: Regulatory Information**

The classification of ash is required in accordance with GR 634 of the NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT NO. 59 OF 2008), WASTE CLASSIFICATION AND MANAGEMENT REGULATIONS which prescribe the Globally Harmonised System (GHS) of classification and labelling of chemicals, as represented in South African National Standard SANS 10234:2008 Ed 1.1.

## **Section 16: Other Information**

**Prepared by:** Eskom Research, Testing and Demonstration

**Approved by:** Eskom Holdings SOC Ltd

**Approval date/ revision date:** December 2014/ as required by legislative changes

Eskom Holdings SOC Ltd believes that the information contained in this Material Safety Data Sheet to be accurate and up to date. The information is offered in good faith but Eskom Holdings SCO Ltd does not assume liability for the use of the information. The information is not intended to be legal advice.

