LABORATORY INDUCTION

POLLUTION RESEARCH GROUP

UNIVERSITY OF KWAZULU-NATAL

Introduction

- The Pollution Research Group is based in Durban at The University of Kwa-Zulu Natal, Howard College campus, Chemical Engineering.
- Professor Chris Buckley is the head of the research group.
- Our team comprises of research engineers, project coordinators, technicians and experts in microorganisms and parasites.
- Due to the innovative types of research and collaborations with the municipality and other key partners, PRG attracts international students and researchers.

PRG
pollution research group

Pollution Research Group

- PRG covers the overall aspects of laboratory analytical work for the characterization of faecal sludge from the different streams undertakes laboratory analysis of samples collected from on-site sanitation facilities.
- This includes administrative work necessary prior to analysis, tasks followed from the storage of samples to analysis of the data from experimental results, methodology and health and safety aspects.
- Samples are tested for mechanical, chemical and biological properties.
- PRG disseminates the data obtained on different properties with different partners in the field of water and sanitation.

Purpose

In the interest of health and safety, this presentation shall provide information and instruction at work for all employees at the workplace. This is a requirement by the law, Act 85 of 1993.

This presentation explains health and safety risks pertaining to the work environment.

Lab users are required to know their workplace and the associated health risks in order to identify, report and minimize health risks.

The Occupational health department is to be used for vaccinations during normal working hours of 08:00-16:00.

For work related incidents at PRG-Howard College that require medical attention, staff are referred to Entabeni Hospital.

Conditions for lab use

- Completion of the relevant questionnaires.
- Meeting with PRG management and supervisor on arrival
- Allocation of a PRG supervisor.
- Induction by laboratory manager.
- Practical training and assessment by laboratory manager.
- Drafting of detailed experimental plan and SOPs with the laboratory manager.
- Induction at Newlands Mashu.
- Keeping of a daily diary.
- Submission of weekly progress reports.
- Submission of monthly progress.
- Submission of all reports and data to PRG management prior to leaving
- Handover of samples and work area to the laboratory manager

Health and Safety

- Before undertaking any work in the laboratory, all laboratory users must first be inoculated and receive laboratory induction.
- All laboratory users must be familiar with all the emergency exits.
- Laboratory users must complete their risk assessments and other requested documents before starting laboratory work.
- All cuts and wounds must be covered and assessed for safe use of the laboratory.
- Sample spills on skin, eyes or mouth must only be treated with water on designated stations and attended by a professional immediately.
- Personal Protective Equipment must be worn at all times when working in the laboratory and never taken into the office area.

Health and Safety

Personal protective equipment must be worn at all times in the laboratory.

Laboratory use is prohibited without laboratory users having full PPE on.

No lab coat and gloves to be worn in the office/lift.

Blue overalls and gumboots to be worn on site.

Washing hands

PRG Laboratory Rules

- No eating or drinking or smoking is permitted in laboratory.
- Always wear lab coats, gloves, safety shoes and goggles.
- Laboratory coats must be fully buttoned up at all times.
- Coats are not taken home for washing and not worn outside of the laboratory.
- Cell phones are not to be used whilst working in the laboratory.
- No friends allowed in lab. (Need to be vaccinated).
- Pipetting by mouth is strictly forbidden.
- Always swab work areas with 70% alcohol before and after working.
- Clear bench tops of all glassware and samples before leaving the laboratory.
- All glassware used must be washed, with all labels removed.
- Hands must be washed using antibacterial soap before leaving the laboratory.
- Keep work areas neat and tidy.

PRG Laboratory Rules

- General bins with the black bags are for non-hazardous waste.
- Bins with autoclave bags are for hazardous waste.
- All broken glassware goes into the allocated bin.
- All chemical and biological spills must be cleaned up immediately.
- Label all hazardous chemical waste bottles with the following: Name of Substance/Chemical, Contents, The Date, Name.
- Place all hazardous waste bottles in the bund area.
- Discard all biological waste (feces, sludge, wastewater) down the sluice.
- Standard Operating Procedures must be followed for each activity carried out.
- Hazard Identification Risk Assessments must be drawn up for each activity carried out in the laboratory.

In case of emergency

If there is a fire and can be contained, familiarise yourself with the location of fire extinguishers and alarm call points.

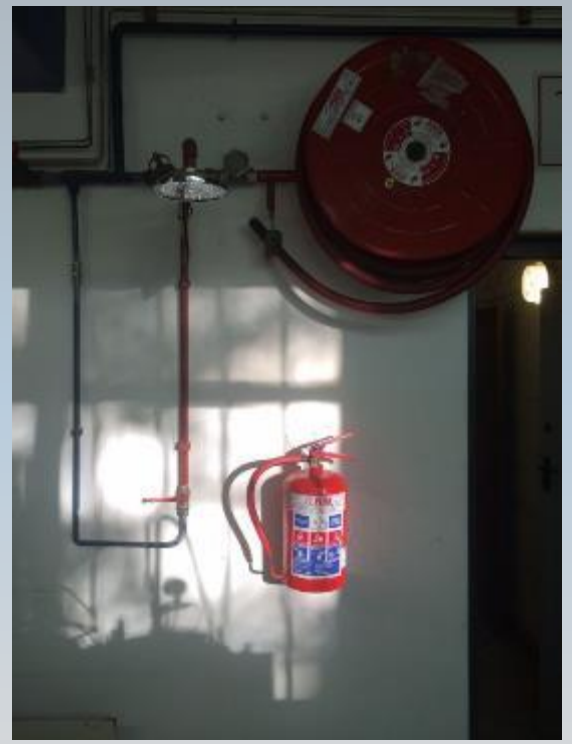
If the fire can't be contained, use the local fire emergency exits and wait in the assembly area.

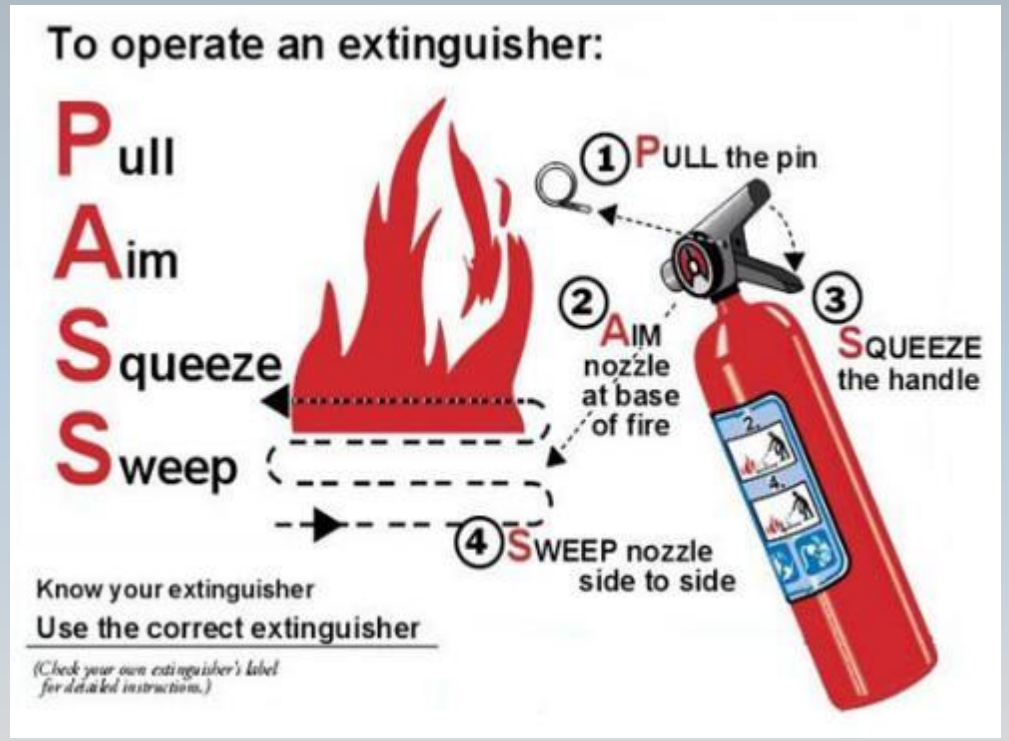
Switch off all equipment and gas lines.

In case of an emergency, do not panic, do not use the lift to evacuate the buildings but the emergency exits to the assembly points.

Do not put yourself at risk.

Regular drills will be done.





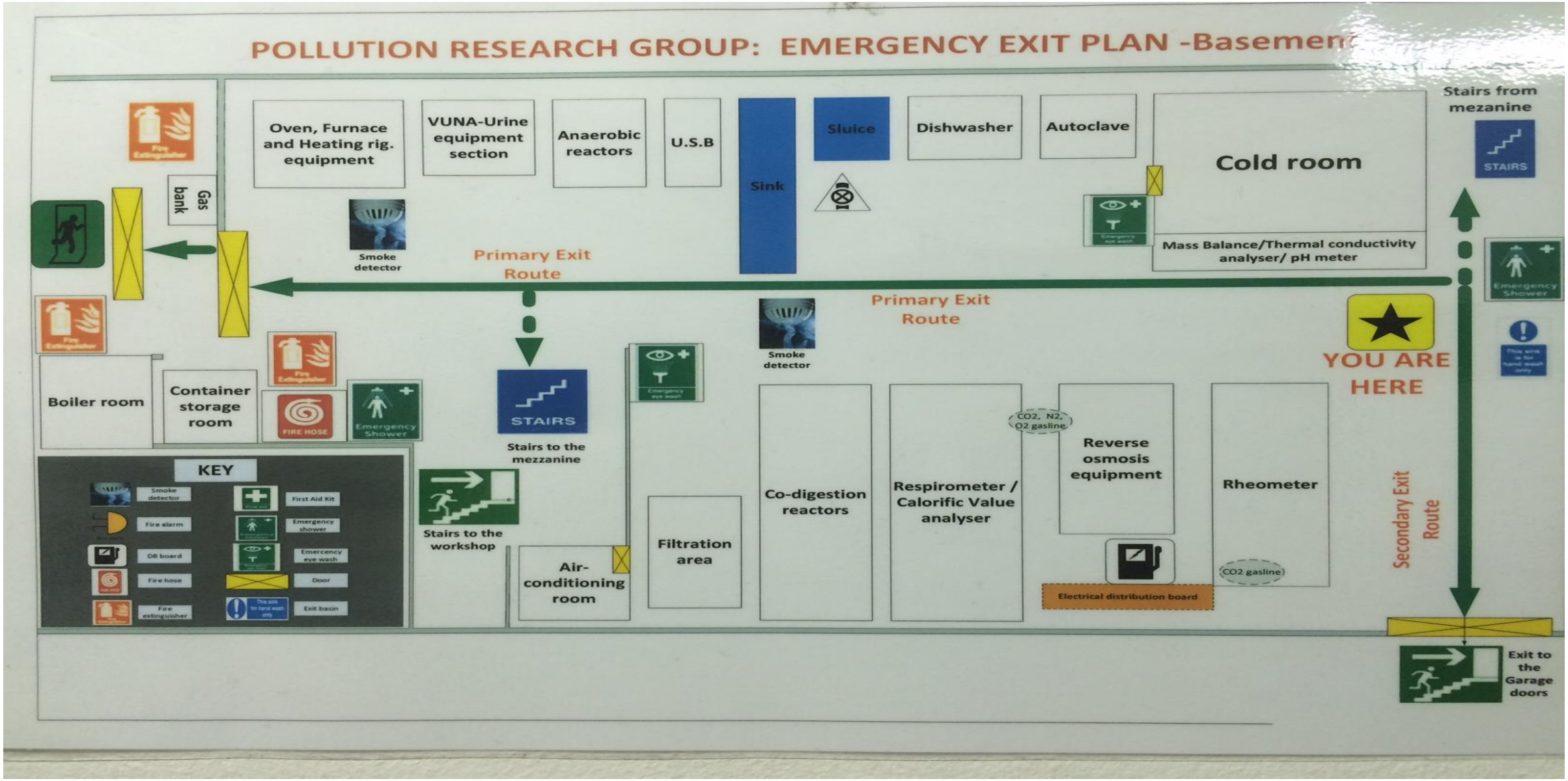
Emergency contact numbers

Howard Clinic : Sister Jane Taylor	031 260 3398
Fire control	031 260 3333
Risk Management Services	031 260 4000/2542
Lift services	0800 004 697

In case of an emergency, emergency and first aiders contact numbers are mounted on the wall at various spots.

• Thobekile Mofokeng	031 260 3384
• Conrad Sydney	031 260 1116
• Preyo Nayager	031 260 1537
• Xoli Hadebe	031 260 1054
• Mbuyu Ntuka	031 260 3215
• Gerald Addieah	031 260 1125
• Merlien Reddy	031 260 1360
• Ayanda Khanyile	Offices behind lecture theatre
• Pretty Siza Madwe	Offices behind lecture theatre

Evacuation routes



Emergency exit and Assembly point

In case of an emergency, emergency exit doors are situated within the laboratory in order to evacuate the building into the assembly point. Do not use elevators.

Do no panic.

Ensure your equipment is safe and proceed to the assembly point.

The School of Chemical Engineering Car park on King George V Avenue is the assembly point.

At the assembly point, all personnel must wait until further notice.

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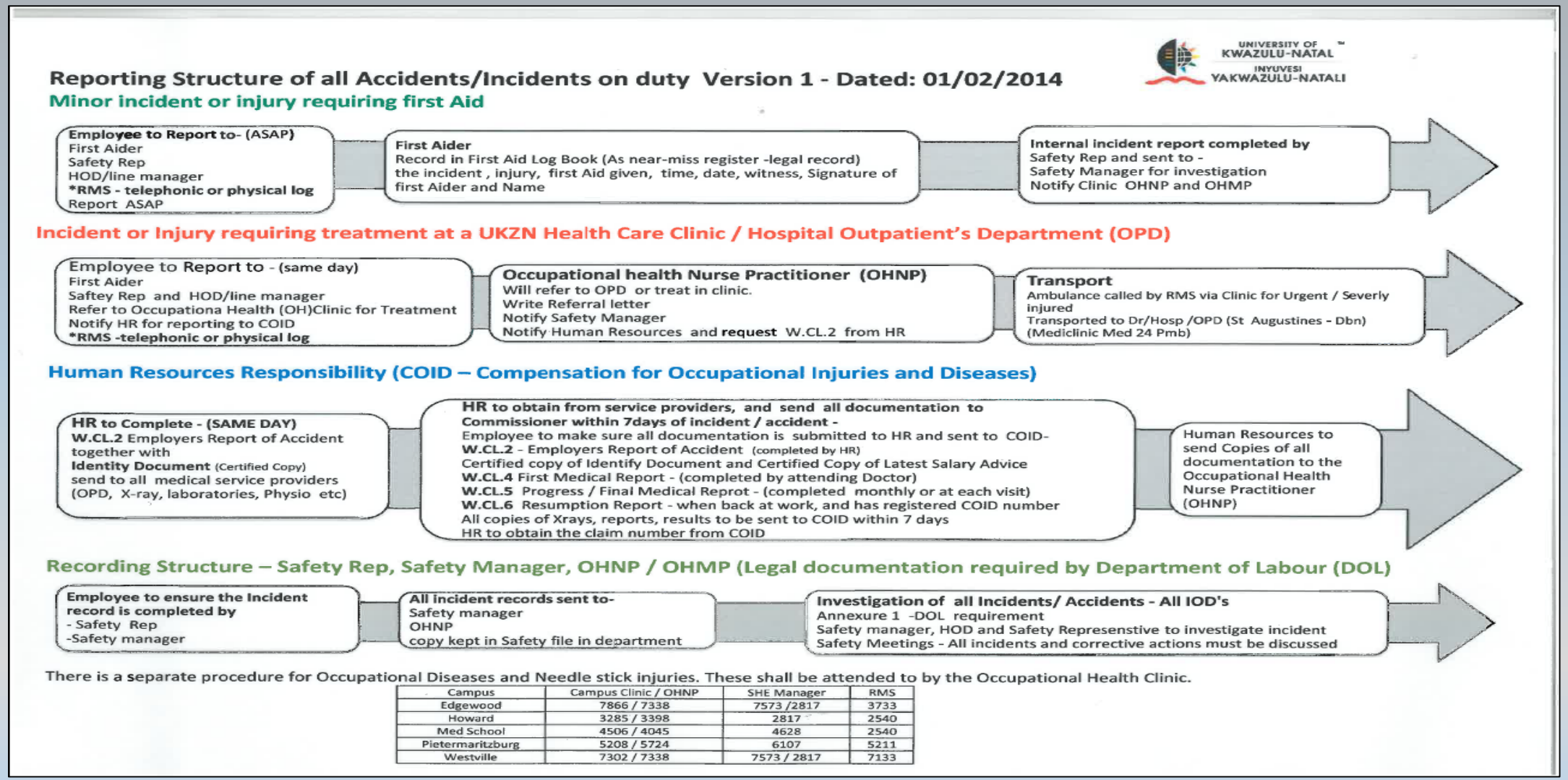
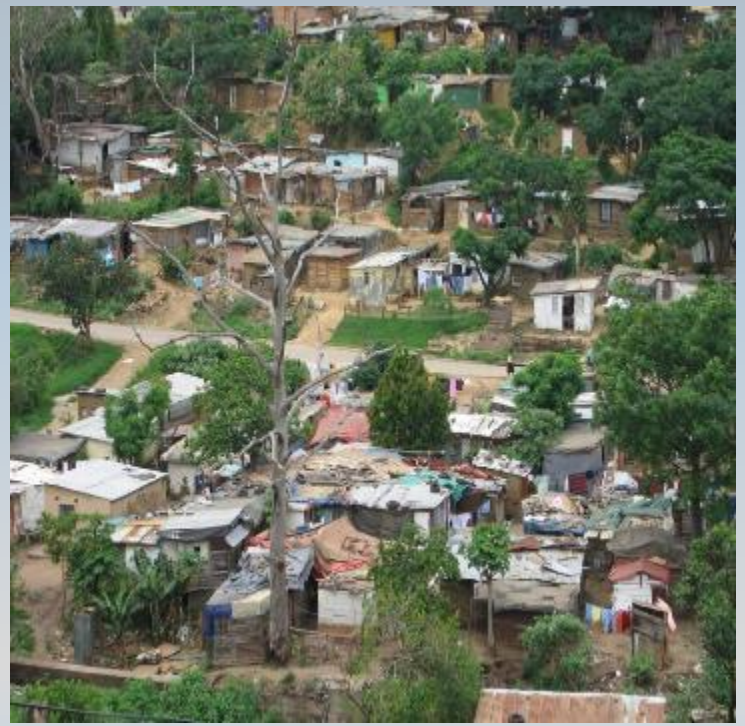
Incident reporting

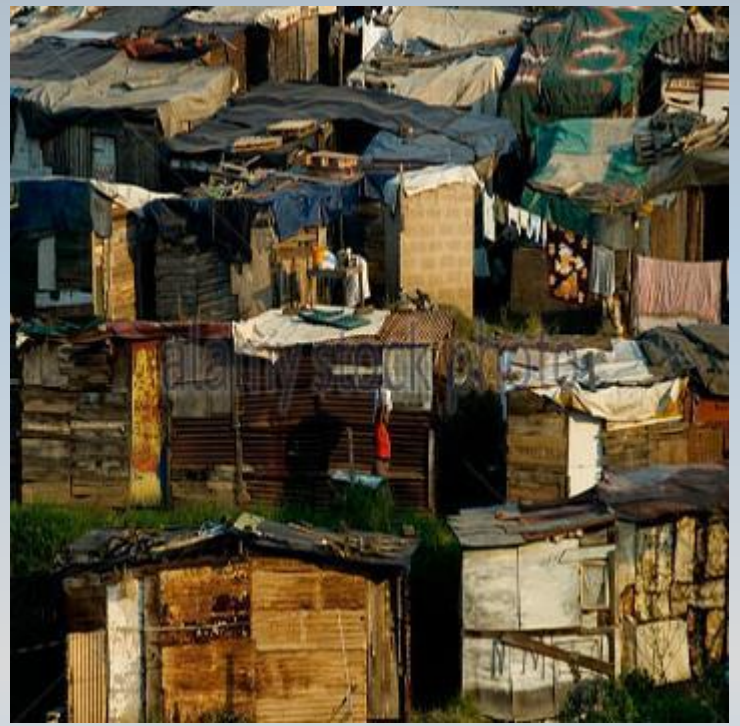


Campus	Campus Clinic / OHNP	SHE Manager	RMS
Edgewood	7866 / 7338	7573 /2817	3733
Howard	3285 / 3398	2817	2540
Med School	4506 / 4045	4628	2540
Pietermaritzburg	5208 / 5724	6107	5211
Westville	7302 / 7338	7573 / 2817	7133

The community

- Samples are collected from townships /informal settlements.
- Pits are emptied every 5 years by the municipality.





Sanitation systems

Wastewater treatment plants

Wastewater, activated or anaerobic sludge is collected from the wastewater treatment plant.

Sampling

- Plan sampling in advance with the municipality, schools and other stakeholders involved.
- Sampling PPE and the sampling box with all the right tools must be prepared in advance not on the actual day of sampling.
- Never go sampling alone.
- Sampling paperwork must be filled out prior to leaving the lab.

Biological Hazards

- These samples contain potential pathogens which can make the handler ill.
- Inoculation and PPE are compulsory for users.
- It is important to disinfect yourself as well as the equipment after sampling.
- Vaccinations : Hepatitis A and B

  Tetanus

  Typhoid fever




Biological Hazards

Hepatitus A and B

Cause: hepatius A and B that attacks the liver.

Symptoms: Jaundice, ache and abdominal pain.

Treatment: proper hygiene, no cure.

Tetanus

Cause: Clostridium tetani through human faeces

Symptoms:

Treatment: antitoxins, antibiotics even surgical treatment.

Typhouid fever

Cause:Salmonella typhi transmitted through human faeces.

Symptoms : fever, headache, diarrhoea, rose spots.

Treatment: Antibiotics

Biological Hazards

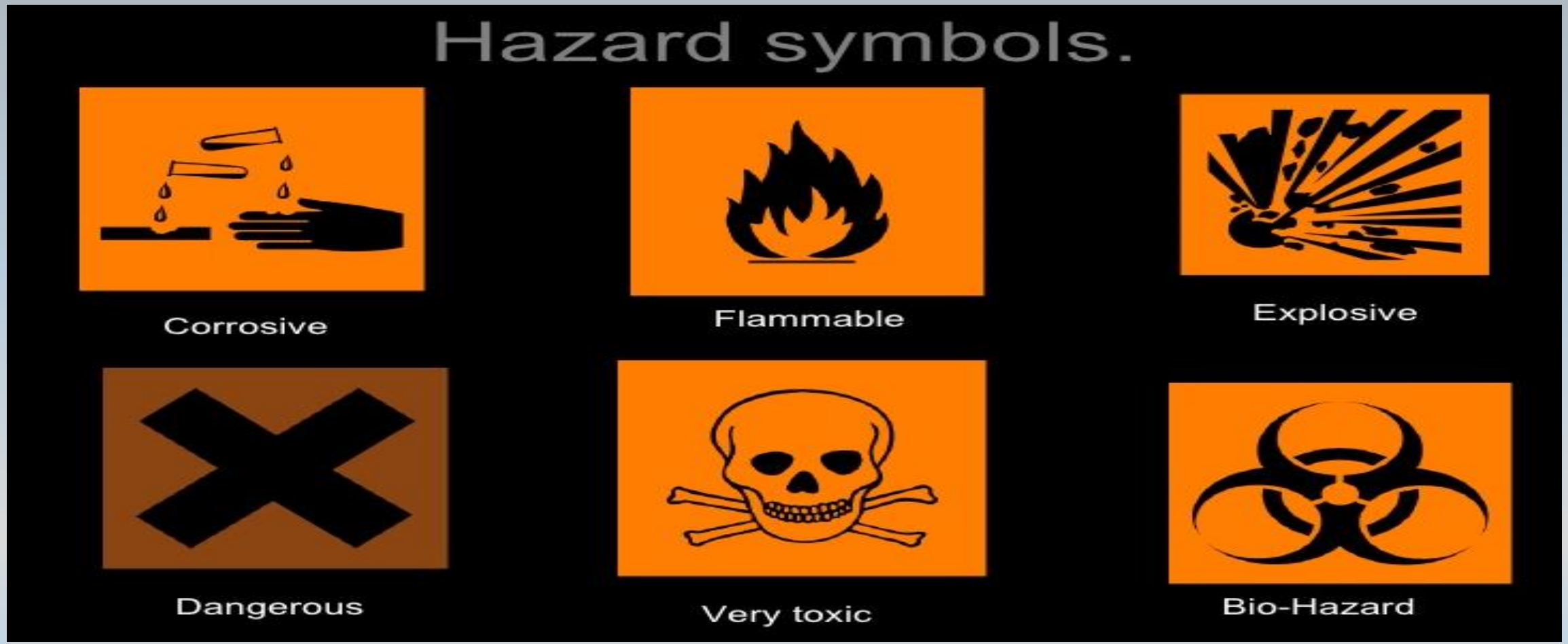
Hepatitus A and B

Tetanus

Typhoid fever

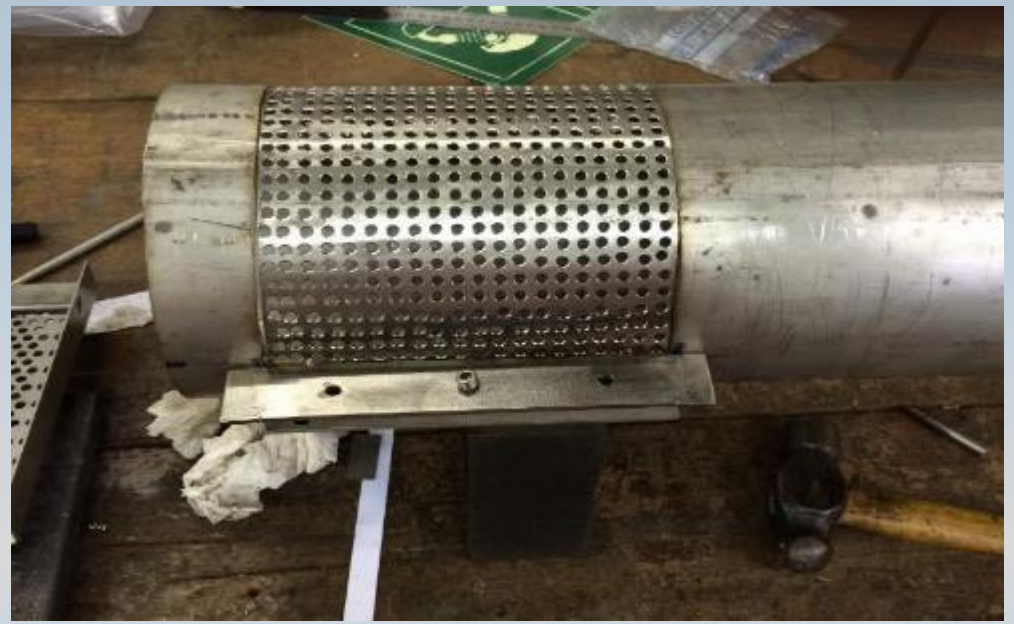
Chemical Hazards

- The following are chemical hazards warning signs to warn the user on the dangers of each chemical.
- The user must check the labelling of each chemical and handle it appropriately.



Mechanical and Electrical Hazards

- Users are to take note of equipment around their workstations and harzards assocciated with them.
- Equipment generate heat and have hot surfaces that can cause severe burns.
- Nigligence and incorrect use of equipment can result in accidents in the laboratory.

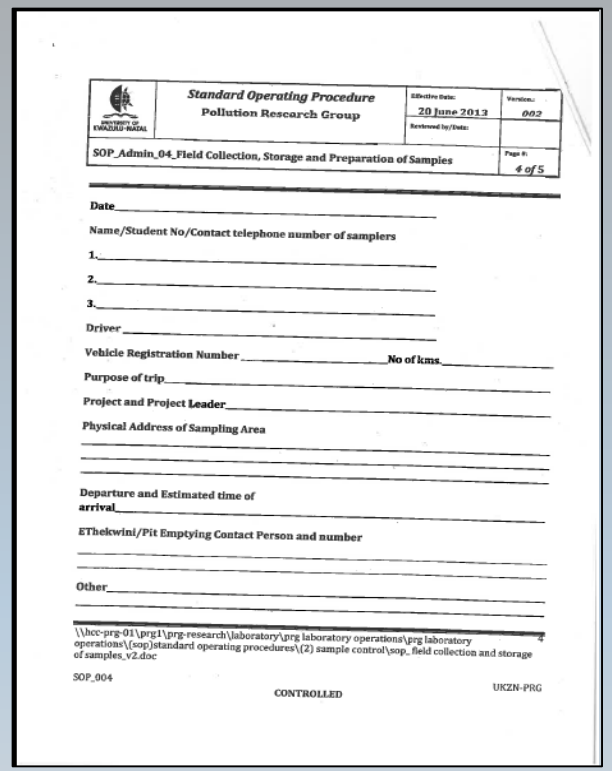


Mechanical and Electrical Hazards

Laboratory equipment are equipped with accessories that protrude out and are a danger to researchers walking by.

Laboratory equipment have rotors moving at high speed and should not be touched when operational.

Sample Collection and Receipt



Standard Operating Procedure
Pollution Research Group
Effective Date: 20 June 2013
Version: 002
SOP_Admin_04_Field Collection, Storage and Preparation of Samples
Page 4 of 5

Date

Name/Student No/Contact telephone number of samplers

1.
2.
3.

Driver

Vehicle Registration Number ____ No of kms

Purpose of trip

Project and Project Leader

Physical Address of Sampling Area

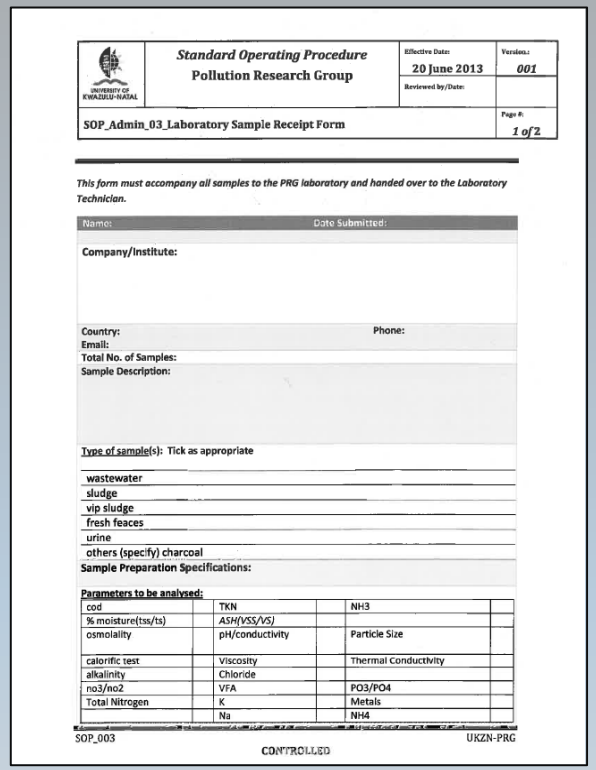
Departure and Estimated time of arrival

EThekwini/Pit Emptying Contact Person and number

Other

\\hcc-prg-01\prg1\prg-research\laboratory\prg laboratory operations\prg laboratory operations\(sop)standard operating procedures\(2) sample control\sop_ field collection and storage of samples_v2.doc

SOP_004 CONTROLLED UKZN-PRG



Standard Operating Procedure
Pollution Research Group
Effective Date: 20 June 2013
Version: 001
Reviewed by/Date:
SOP_Admin_03_Laboratory Sample Receipt Form
Page 1 of 2

This form must accompany all samples to the PRG laboratory and handed over to the Laboratory Technician.

Name: Date Submitted:

Company/Institute:

Country: Phone:
Email:
Total No. of Samples:
Sample Description:

Type of sample(s): Tick as appropriate

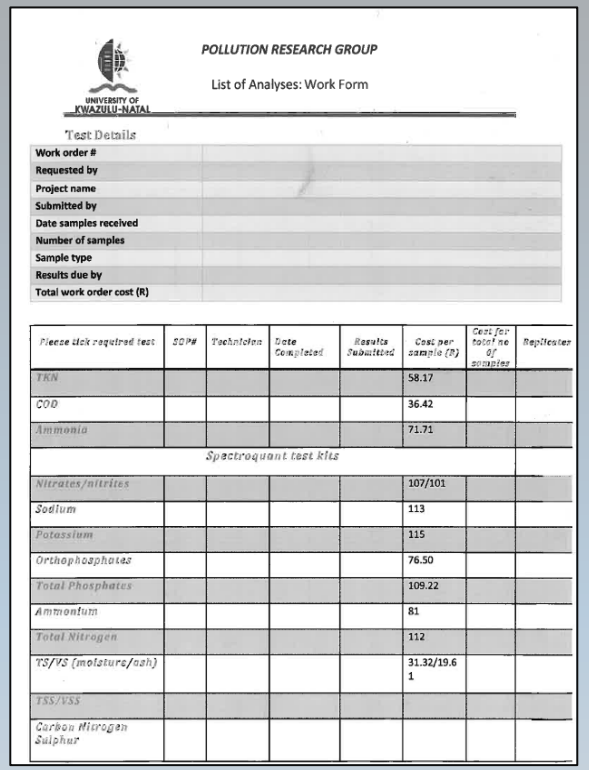
wastewater
sludge
vip sludge
fresh feaces
urine
others (specify) charcoal

Sample Preparation Specifications:

Parameters to be analysed:

cod		TKN		NH3	
% moisture(tss/ts)		*ASH(VSS/VS)*			
osmolality		pH/conductivity		Particle Size	
calorific test		Viscosity		Thermal Conductivity	
alkalinity		Chloride			
no3/no2		VFA		PO3/PO4	
Total Nitrogen		K		Metals	
		Na		NH4	

SOP_003 CONTROLLED UKZN-PRG

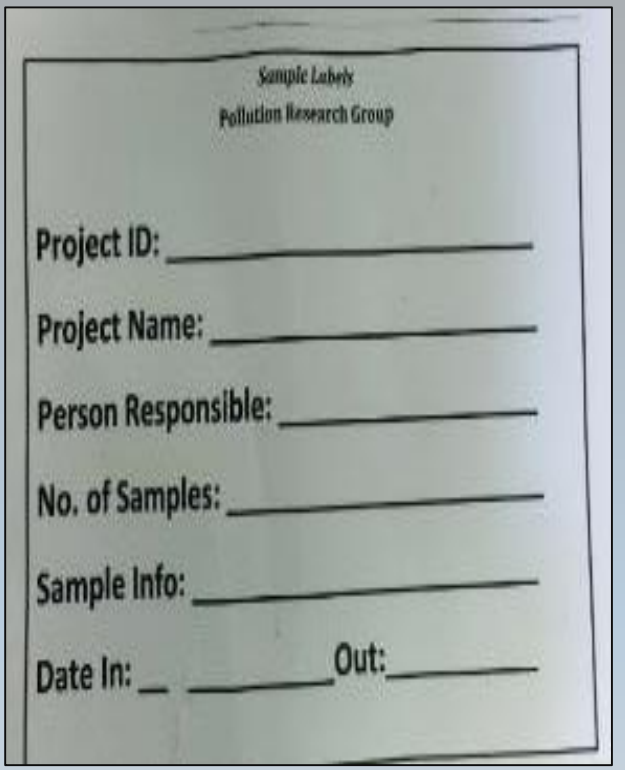


POLLUTION RESEARCH GROUP
List of Analyses: Work Form

Test Details

Work order #	
Requested by	
Project name	
Submitted by	
Date samples received	
Number of samples	
Sample type	
Results due by	
Total work order cost (R)	

Please tick required test	SOP#	Technician	Date Completed	Results Submitted	Cost per sample (R)	Cost for total no of samples	Replicates
TKN					58.17		
COD					36.42		
Ammonia					71.71		
Spectroquant test kits							
Nitrates/nitrites					107/101		
Sodium					113		
Potassium					115		
Orthophosphates					76.50		
Total Phosphates					109.22		
Ammonium					81		
Total Nitrogen					112		
TS/VS (moisture/ash)					31.32/19.61		
TSS/VSS							
Carbon Nitrogen Sulphur							



Sample Labels
Pollution Research Group

Project ID: _____

Project Name: _____

Person Responsible: _____

No. of Samples: _____

Sample Info: _____

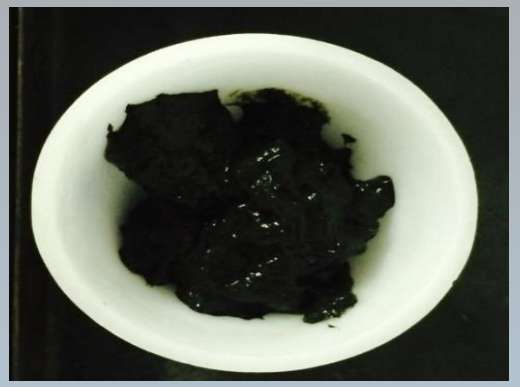
Date In: __ _____ Out: _____

- Fill out **SOP_Admin_04_Field Collection, Storage and Preparation of Samples a**nd book the eThekwini vehicle prior to sampling.
- **SOP_Admin_03_Laboratory Sample Receipt Form** must accompany samples brought into the laboratory.
- **List of Analyses: Work Form** must be filled out before work is carried out in the laboratory.
- Enter sample details in the **Cold Room Inventory** before labelling and storing samples.

Sample pictures


(a)


(b)


(c)


(d)

Figure 2: A researcher must fill in a sample receipt form with a technician, fill in a register to store samples in the coldroom and a work order form where a researcher can select the analysis to be done on the samples. Samples come in 25L buckets or suitable container (a) and is transferred to a smaller 1L container (b). A sub sample (c) is taken for analysis and for moisture content (d) is an example of an analysed sample.


(a)


(b)

(c)

Figure 3: Product of one of the research project that dries faecal matter (a) and produce latrine dehydrated pallets (b) to be used in agricultural industry as a fertiliser. On the far right is a demonstration of the Decentralised Water Treatement System (DEWATS) plant that treats water without the use of electricity.

Questionnaire

1. **Name the compulsory PPE to be worn when working in the lab.**
2. **Name 2 hazards in the lab.**
3. **Are lab coats and gloves allowed in the office and the lift?**
4. **Where is the emergency assembly point?**