	MANUAL	KOEBERG OPERATING UNIT
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GM / PSM's MESSAGE REGARDING SAFETY EXCELLENCE

Safety first Always. That is the refrain that we must use to ensure that safety is always the deciding factor in everything that we do at our nuclear power station. As an employee or contractor, every nuclear professional is responsible for safety -- be it the safety of our colleagues, our plant, or our environment.

As the General Manager of Koeberg, it is my responsibility to ensure that every individual who works at our power station has the tools and protective equipment available to them to ensure that they perform their job without risk to life or limb, and that they return to their families safely at the end of each working day. Please make sure that you use these tools and safety measures, including processes, to keep yourself and your colleagues safe. Should you feel that something is amiss, speak to your supervisor, who will address it, or escalate as necessary. In order to perform your job, you should never put yourself in harm's way.

Being an industrial site, we must be aware that there are hazards. Despite the fact that we have a sound Safety, Health and Environmental (SHE) Management System in place to manage these risks, we all play a role in making it work for use. We cannot afford complacency, and we must be actively promoting safe behaviour. Safety is not the responsibility of the safety representative, or "somebody else." We must also remember that quality is an integral part of any SHE programme, so at Koeberg, we often refer to "SHEQ," to ensure take quality into account.

We have set ourselves several targets to help us maintain a focus on safety while meeting our business priorities. Our aim is to achieve the following:

- Zero Lost Time Injuries on Industrial Safety
- 35 days on Outage Performance; and
- 7 days Forced Lost Rate on Plant Reliability

I want to acknowledge line managers, supervisors, team leaders, and safety representatives in whom we place a great deal of trust and responsibility to build and support a healthy nuclear and conventional safety culture at Koeberg.

Please take safety seriously. We are the guardians of the only nuclear power station on the African continent, and we are the footprint for future nuclear development in our country. Furthermore, we are helping to lay the foundation for nuclear on the African continent. All eyes are on us. However, our character should speak for itself. There is a saying, "Integrity" is what you do when nobody is watching." Do the right (safe) thing even when nobody is watching.

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INTRODUCTION

- Upon completing of this module, you will be familiar with the administrative functions and all the responsibilities of Koeberg Employees.
- You will also be made aware of all the SHE aspects you need to adhere to and how to react in emergencies.
- Remember: SHE instructions alone will not ensure the complete health and safety of each person.

IT IS OF VITAL IMPORTANCE THAT WE FOSTER SHE CONSCIOUSNESS IN OURSELVES AND TOWARDS OUR FELLOW WORKERS TO ENSURE OUR WELLBEING.

1. OBJECTIVES

- Knowledge of the administrative aspects of the Koeberg SHE Process
- Adherence to all SHE aspects
- Understanding staff Orientation / Induction training

2. MISSION

To provide a safer and healthier work environment to all staff and the public.

3. LEGISLATION

3.1 OCCUPATIONAL HEALTH AND SAFETY ACT, NO. 85 OF 1993.

This act provides for the safety, health and environment of all persons at work, the safety, health and environment of persons in connection with the use of the plant and the protection of persons other than persons at work against risks of safety, health and environment, arising out of or in connection with the activities of all persons at work.

3.2 SECTION 8: DUTIES OF EMPLOYERS TO THEIR EMPLOYEES IN TERMS OF THE OHS ACT.

- Every employer shall provide and maintain a working environment that is safe and without risk.
- The provision and maintenance of safe systems of work / plant / machinery.
- Eliminate or mitigate hazards before supplying Personal Protective Equipment (PPE).
- Arrange for safety and health related to production, processing, use, handling, storage and transport of articles / substances.
- Establish hazards, introduce precautionary measures and apply such measures.
- Provide information, instructions, training and supervision to ensure the safety / health of staff.
- Not allow or permit work unless adequate precautionary measures are established.
- Ensure requirements of the Act are complied with by staff / persons on premises under control where machinery is used.
- Enforce measures to ensure safety / health.

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- Train supervisors in hazards and give them authority to implement precautionary measures (first - line of defence).
- Cause employees to be instructed in the scope of authority.
- Cause all Koeberg employees and contractors to be made conversant with hazards and precautionary measures.
- Ensure all SHE Reps understand their roles and responsibilities with respect to incidents in their workplaces, monthly inspections etc.

3.3 SECTION 14: DUTIES OF EMPLOYEES AT WORK

- Take reasonable care for the health and safety of him / herself and other persons who may be affected by his/her acts or omissions.
- As regards any duty or requirement imposed on his employer or any other person by this Act, co-operate with such employer or person to enable that duty or requirement to be performed or complied with.
- Carry out any lawful order given to him/her, and obey the health and safety rules and procedures laid down by his/her employer, in the interest of health and safety.
- If any situation which is unsafe or unhealthy comes to his/her attention, as soon as practicable report such situation to his/her employer or to the health and safety representative for his/her workplace.
- If he/she is involved in any incident which may affect his/her health or which has caused an injury to himself/herself, report such incident to his/her employer or to anyone authorized thereto by the employer, or to his/her health and safety representative, as soon as practicable but not later than the end of the particular shift during which the incident occurred.

Employees should note that contravention of requirements set out in this document is also a contravention of Section 38 of the Act and carries a fine of R50 000 or two year's imprisonment or both.

3.4 COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, NO. 130 OF 1993

The compensation Commissioner administers a mutual insurance fund to cover all workmen in the case of occupational injury or disease. The fund is used to pay for hospitalisation, rehabilitation and compensation to employees. Such payments are only made for injuries and diseases resulting from accidents or exposure to stress factors arising out of and in the course of a workman's employment.

However, in certain cases the Compensation Commissioner may decide not to pay any compensation, or, to pay increased compensation.

The Commissioner may decide not to pay any compensation in the case of serious and wilful misconduct. Examples of serious and wilful misconduct are:

- Assaults and fights, unless workman, by reason of his employment is exposed to a liability to be assaulted.
- Drunkenness.
- Contravention of SHE regulations.
- Larking about or horse-playing.

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- Acting for own purpose.
- Any act or omission which the Commissioner may deem to be serious or wilful misconduct. However, in cases of serious disablement or death, the commissioner may pay compensation irrespective of the conditions leading to injury.

The Workman's Compensation fund covers all employees earning up to R75 000 per annum. Employees earning in excess of R75 000 per annum are only covered up to an amount of R75 000, the excess being covered by the Stated Benefits fund. Conditions described for the COID fund are also applicable to the Stated Benefits fund.

4. ESKOM'S SAFETY, HEALTH, ENVIRONMENTAL AND QUALITY POLICY (32-727)

The Eskom Safety, Health, Environmental and Quality Policy Poster can be obtained by via the link below:

<https://hyperwave.eskom.co.za/0x936e3246%200x0499bc0d>

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5. ESKOM'S LIFESAVING RULES

WHY WE HAVE THEM?

ESKOM Lifesaving Rules are “Non – negotiable Rules”

- Lifesaving Rules are rules that describe such extreme behavior that all reasonable employees would agree that anyone guilty of knowingly and willfully violating one of them is putting their life in jeopardy.
- These rules are generally determined in terms of the consequences of the behaviors they describe, i.e. if a particular set of behaviors or actions have a very high probability of causing disabilities or fatalities, when performed.
- These rules are created to enforce “zero tolerance” of serious at risk behaviors.
- Five rules have been developed that will apply to all Eskom employees and Contractors.

RULE 1: Open, Isolate, Test, Earth, Bond and / or Insulate before Touch

RULE 2: Hook up at Heights

RULE 3: Buckle Up

RULE 4: Be Sober

RULE 5: Ensure that you have a Permit to Work

Consequences of Violating an ESKOM Lifesaving Rule

- In terms of general health and safety in Eskom if any of the Lifesaving Rules are not adhered to, it will result in a disciplinary process, which will have the power of dismissal.
- It must be highlighted that Eskom takes a ZERO TOLERANCE stance to violation of these rules and will therefore push for a sanction of dismissal during a disciplinary hearing.
- If a Lifesaving Rule is broken the consequences need to be applied consistently and uniformly

6. ROLES AND RESPONSIBILITIES

6.1 LINE MANAGERS / SUPERVISORS AND SAFETY PRACTITIONERS

The Occupational Health and Safety Act no.85 of 1993, section 8 (e); (f); (i) and (j) places a duty on the Employer to provide information, training, instruction, supervision and to ensure adherence to safety standards.

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- **The core elements of health and safety leadership are:**
 - Acting as a Role model.
 - Motivating employees to behave safely.
 - Monitoring performance.
 - Instilling a sense of achievement and pride.
 - Coaching and approaching of staff in order to re-enforce safety behaviour.
- **Planning**
 - Supervisors must anticipate potential hazards and take preventative measures. They should be open for suggestions from both Management and employees.
- **Morale**
 - Supervisors should foster the development of safety attitudes in employees so they will work safely, even in the supervisor's absence.
 - One aspect which has real impact is a pre-job brief with your team. This demonstrates to them your concern for their safety right from the start.

Production can be broken down into various aspects to assist supervisors in organising work to achieve more productivity. The following points highlight the supervisor's and employees' responsibilities.

- **Efficiency** – An efficient operation is one which gets out the most production at the lowest cost. A safe operation is an efficient operation.
- **Good housekeeping** – Supervisors should enlist the co-operation of employees to maintain good housekeeping.
- **Safe working conditions** – Supervisors encourage and ensure that employees report unsafe conditions and the need to follow up with corrective actions.
- **Safety attitude** – One of the most important SHE fundamentals is taking accountability for your own safety and for that of your colleagues, and this attitude should be modelled by every employee in the organisation.

One of the most difficult safety activities for supervisors is the development and maintenance of a good safety attitude in all employees. This requires tact, psychology, teaching, diplomacy, discipline, and an “accident resilient” operation. Good supervisors learn all the angles of creating safety attitudes and use them continually. A balanced programme of morale building and training on the part of supervisors is recommended to support and encourage employees to help generate a culture where everybody wants to act and behave in a safe manner.

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6.2 SAFETY, HEALTH AND ENVIRONMENT (SHE) REPRESENTATIVES

It is a statutory requirement that SHE Representatives be appointed for each work area i.e. section 17(1) appointment.

Appointed SHE Representatives are required be familiar with the work area and to conduct monthly inspection of their designated areas.

During SHE Representative's inspections, focus is directed to sub-standard acts and conditions that must be reported to the SHE Committee in order to ensure that action is taken to remedy the reported unsafe condition or act.

You should know who your SHE Representative is and where he/she can be contacted.

6.3 FIRST AIDERS

It is a statutory requirement that trained First Aiders must be appointed for each work area with the necessary equipment to treat first aid injuries i.e. GSR 3 (4) & (5) appointment.

You should know who your first aider is, where he/she can be contacted and where the first aid box is situated.

6.4 SAFETY / HEALTH AND ENVIRONMENT COMMITTEES

The basic function of all SHE Committees is to create and maintain interest in safety and to reduce accidents. This is achieved by discussing SHE problems reported by subordinates, taking decisions regarding SHE related matters, SHE problems, reporting to senior management, assisting senior management in formulating SHE policies and objectives.

SHE Committees at Koeberg are divided into two levels in order to cover the whole organisation.

These Safety Committees are:

1) Section / Group SHE Committees

This statutory committee covers a section of the work place such as a workshop, office or stores area.

The persons serving on statutory SHE Committees are appointed in writing by management. They must be people with a thorough knowledge of the work areas.

2) SHE Steering Committee

This committee covers the whole of the Power Station and consists of all heads of Departments, Trade Union, Contractor and SHE Representative. The Chairman of the SHE Steering Committee is the Power Station Manager or, in the absence, Plant or Nuclear Services manager.

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7. SAFETY, HEALTH, AND ENVIRONMENT (SHE)

All personnel are expected to adhere to legal statutory and Eskom regulations designed to protect the safety and health of each individual. However, these regulations and/or SHE instructions alone will not ensure the complete safety of a person, but the responsibility remains with each individual in the team.

7.1 SHE RISK ASSESSMENT

- **Overview of the SHE Risk Assessment**

SHE Risk assessment can be defined as the identification of undesired events, their causes and analysing their likelihood (and exposure) and potential consequences by considering existing control measures in order to make a valued judgement as to the risk's acceptability. Each individual group or section must formally assess all the risks they are exposed to. Each group must have a SHE Risk Assessor which is the person who attended the SHE Risk Assessment training course to perform risk assessments in that particular section or group.

Such assessments should be co-ordinated by the Head of Group in conjunction with the Supervisor. It is not the responsibility of the SHE Representative to conduct SHE risk assessments but he or she may participate in this process.

There are different types of risk assessments that can be applied at the different levels of business of operations.

- **Baseline Risk Assessment:**

It is focused on identifying risks across an enterprise, a business, an operation or project. A wide range of risks can be identified, involving potential risks to the people, equipment, processes/practices, materials, environment and legal/liability.

- **Issue-based Risk Assessment:**

The focus is on achieving more specific detail on actual risks arising during a work process, job task or similar activity. Issue-based risk assessments require a step-by-step analysis of the process activity. Each risk identified can be analysed and managed by applying risk controls to mitigate these risks.

- **Continues Risk Assessment:**

It is a management function which is normally charged with monitoring the performance of employees with respect to production, quality and safety. There are various methods for monitoring performance of which some are inspections, job observations (formal/planned and informal), safety toolbox talks.

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- **Guidelines on the Risk Assessment, SHE Programme and Legal Register processes.**

The SHE Risk Assessment Guide (KGA-067) provides guidelines on how to perform, Safety, Health and Environmental (SHE) risk assessments within Koeberg in order to identify, quantify and minimise exposures to risk.

Department and Group Heads are responsible for compiling the SHE programme with the input of selected personnel in achieving the SHE objectives and targets in accordance with KAA-785 to ensure improvement in the SHE performance. The SHE Programme addresses the responsibility for achieving objectives and targets, together with the means / resources i.e. financial (actual budget), people and physical resources (monitoring equipment, laboratories etc.) training and development and timeframe by which they are to be achieved.

The SHE Legal Register promotes awareness and understanding of legal responsibilities. This register contains identified legislation and other statutory requirements applicable to SHE aspects of KOU activities, products or services.

7.2 HOUSEKEEPING

A place for everything and everything in its place! This means:

- Good stacking and storage of equipment.
- Keeping the work place neat and tidy.
- Cleaning up after the completion of a job and removing all superfluous materials.
- Having designated areas / places for every item or object.
- Reducing of fire hazards.
- Reducing of injuries / accidents.

7.3 PERSONAL PROTECTIVE EQUIPMENT (PPE)

- 7.3.1 The Health and Safety Act requires that all PPE be issued free of charge to all personnel required for his days' work. The individual must maintain this in a good condition and use it as required. He/She must report to their supervisor if PPE is torn so that it can be replaced.
- 7.3.2 PPE does not prevent accidents, only injuries. So, look after the equipment and handle it with care.
- 7.3.3 Your supervisor will do a monthly inspection on your PPE and replace if necessary.
- 7.3.4 Use your PPE where the symbolic safety signs indicate the requirement to wear them.
- 7.3.5 Within the Koeberg Nuclear Power Station, all plant areas, workshops, laboratories and stores have basic Personal Protective Equipment requirements that must be complied with. Management Directive 009 outlines the Personal Protective Equipment requirements in all of the above-mentioned areas and applies to all Eskom staff, contractors, casual workers, as well as visitors to our site.

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7.4 SAFE DRIVING PRACTICES

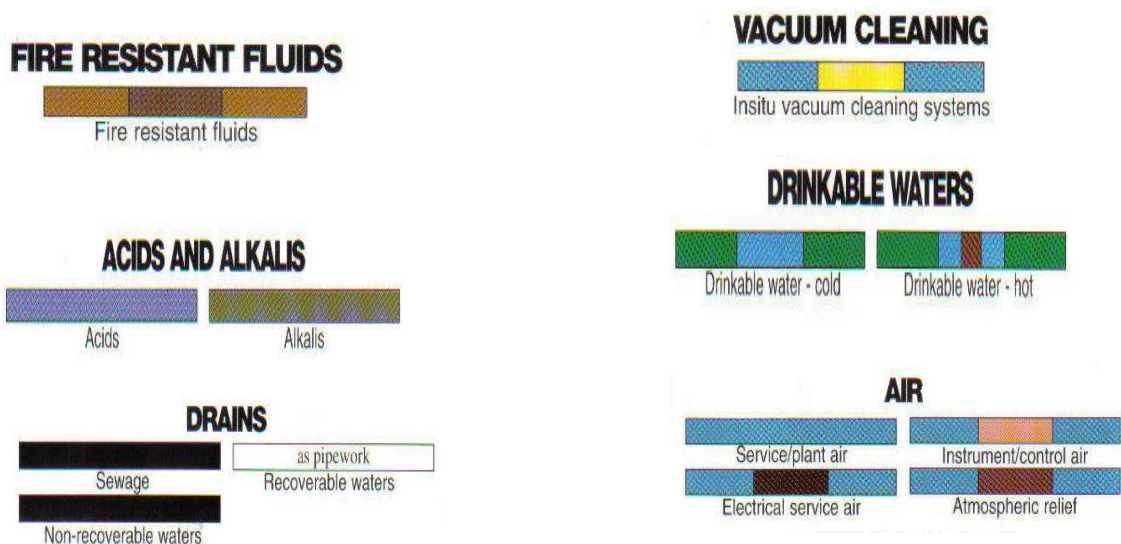
- 7.4.1 All vehicles operating on site must comply with the road traffic ordinance – ORD 21 of 1966. Speed limit on site is 35 km/h and all road and information signs must be adhered to.
- 7.4.2 Koeberg is situated inside a Nature Reserve, wild animals and pedestrians always have the right of way on site.
- 7.4.3 All persons driving a vehicle on site must be in possession of a valid national driver's license and valid Eskom Driver permit (when driving Eskom vehicle)
- 7.4.4 No person is allowed to be transported on the back of an LDV or Truck on any of our sites.
- 7.4.5 The usage of Cell phones whilst driving is prohibited anywhere on site.

7.5 COLOUR CODING

Colour coding of pipes, equipment, areas, is used extensively in industry for ease of identification, highlighting hazards and demarcating areas.

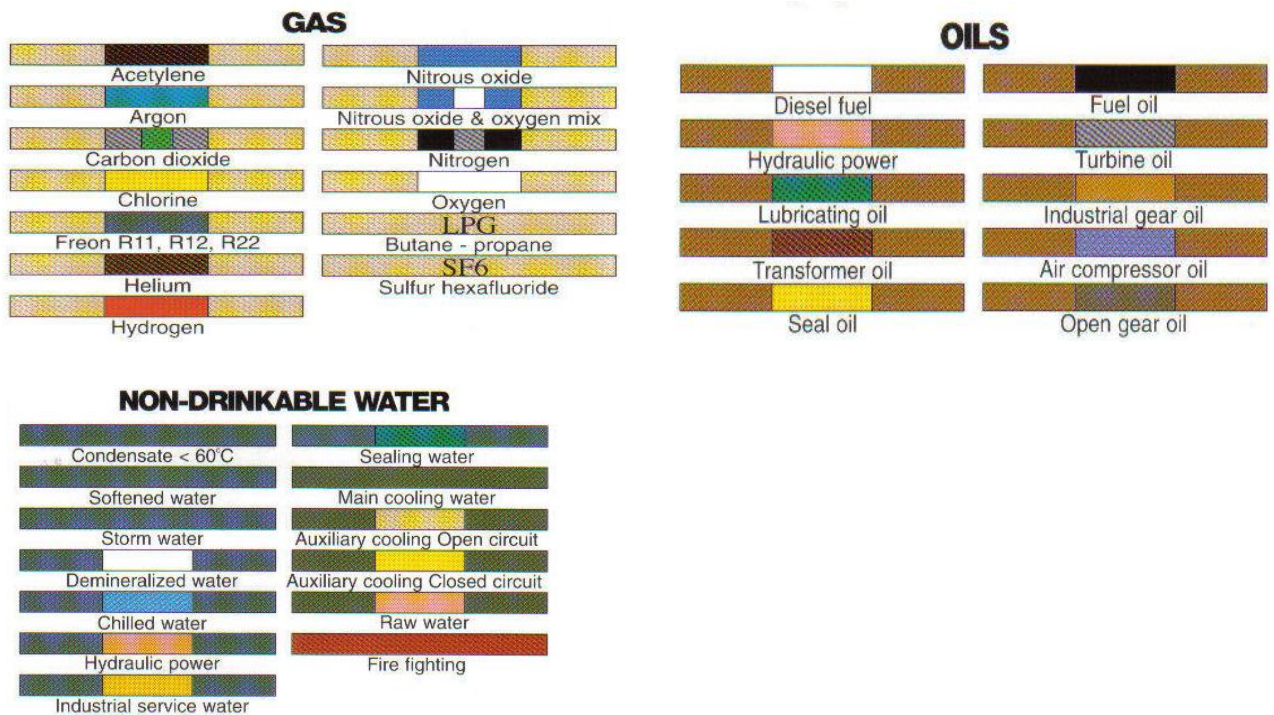
7.5.1 Pipe Colour Coding

This standard colour coding is to be used at individual work units after completion of a risk analysis.



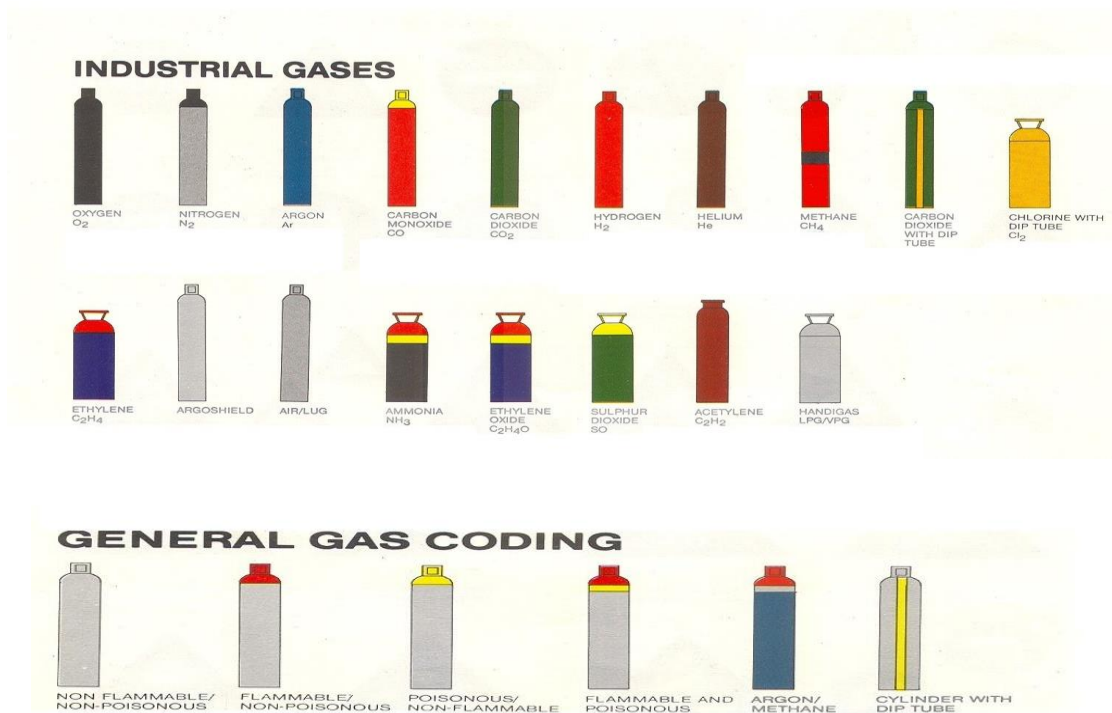
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7.5.2 Identification of Gas Cylinders

All gas cylinders must be colour coded in accordance with the following color codes specified in the South African National Standards (SANS).



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7.5.3 Informatory Notices

The colour coding of the notices must correspond with the colour coding of the symbolic safety sign. In addition to the symbolic sign explanatory information appears below the symbol.



CARRYING OF LONG
MATERIAL
PROHIBITED



USE OF COMPRESSED
AIR TO DUST BODY
PROHIBITED



SUSPENDED
LOADS
HAZARD



ELECTRIC
SHOCK
HAZARD

7.5.4 Classification of Safety Signs/Notices

There are four basic categories of safety signs:

Prohibitory signs

These signs indicate that certain behaviour is prohibited or must stop immediately, for example, smoking in a "No Smoking" area. The signs are formed by a red circle with a red diagonal bar running from top left to bottom right of the circle, on a white background.

Warning/Caution signs

These are signs, which give warning or notice of a hazard. The signs are black outlined triangles filled in by the safety colour – yellow. The symbol or text is in black. The combination of black and yellow identifies the need for CAUTION.

Mandatory signs

These signs indicate that a specific course of action is required, for example, EYE PROTECTION MUST BE WORN. The safety colour is blue with the symbol or text in white. The sign is circular in shape.

Information signs

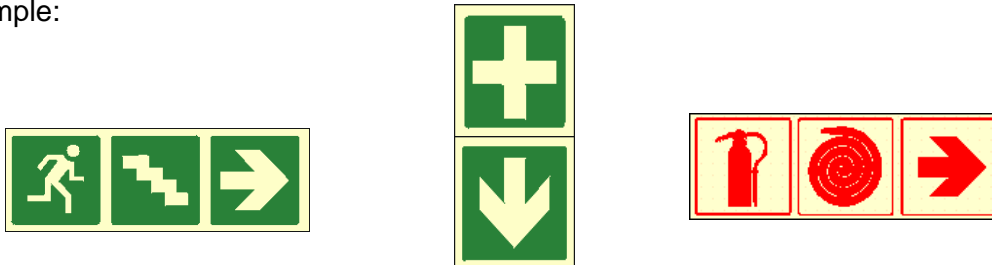
These signs provide information about safe conditions. The signs are square in shape, coloured green with white text or symbol. The safety colour green is associated with GO.

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7.5.5 Fixing of Signs

In the case of safety signs that have low mechanical strength, the sign shall be attached to a flat surface or mounted on a plate or in a frame.

When placing / fixing signs the symbolic pictogram sign precedes the directional / location sign, for example:



The basic colours used are:

- | | |
|---------------|---|
| RED | Usually associated with danger and for identification of fire equipment. |
| GREEN | This is the “Safe” colour. It is used for First Aid Services, general information and demarcation of safe areas. |
| YELLOW | This colour is associated with hazards. Yellow colour indicates hazards. It is also used to demarcate areas which must be kept clear, such as walkways and escape route. |
| WHITE | White is used for demarcation of storage areas and parking areas. |
| ORANGE | This colour is used for identification of rotating equipment which could be hazardous. Guards on equipment can also be coloured orange on the inside to see when such guard is open or removed. |
| BLUE | A blue background is usually associated with a requirement which must be met. |

Colour

The colour used for symbolic safety signs are yellow, red, blue, green, black and white.



7.6 SYMBOLIC SAFETY SIGNS

A system of identifying industrial hazards with easily recognised symbolic safety signs have been developed for South African conditions. The whole concept of this system is to identify industrial hazards without the use of words.

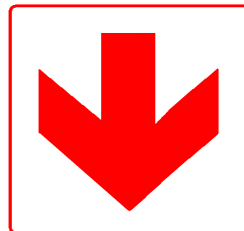
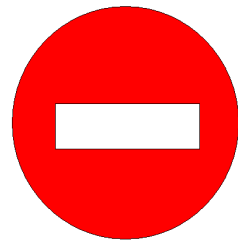
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There are five different categories of signs which can easily be identified by their shape and colour. Each symbolic sign consists of a combination of:

- A geometric shape,
- A colour,
- A pictogram.

Geometric Shape

Three basic shapes are used. These are triangles, squares and circles.



Pictograms

The combinations of shape and colour indicates a general hazard of informatory situation. However, where a specific message is to be conveyed, a suitable coloured pictogram representing the hazard is used, the safety equipment which must be used or specific information regarding direction or location of equipment.

Warning Signs

A triangle with a black border and pictogram and yellow background means there are certain hazards present in the immediate environment which presents possible injury to personnel and requires a warning.

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7.7 PORTABLE ELECTRICAL EQUIPMENT

7.7.1 Portable Electrical Tools

The major hazard of using portable electrical tools is “electricity”. It only takes 30 milliamps and one-thirtieth of a second to cause the heart muscles to stop beating. Unless heart massage is applied immediately the victim would die within a few minutes. It is imperative that we only use portable electrical tools that are in good condition.

7.7.2 Causes of Accidents

Some causes of accidents when using portable electrical tools are:

- Bare wires,
- Broken plugs,
- Breaks in insulation,
- Working in wet area,
- Not observing simple safety rules,
- Improper servicing or maintenance,
- Overloading,
- Poor joints in cables,
- Cables frayed or heating up.

If you have any doubt concerning the safety of a portable machine, do not use it!

All portable electrical equipment that is equipment, irrespective of voltage, that has a flexible cable must be on an inspection register and periodically inspected by a competent person.

7.8 ACCIDENTS, INCIDENTS MANAGEMENT (32-95: OCCUPATIONAL HEALTH AND SAFETY INCIDENT MANAGEMENT PROCEDURE)

7.8.1 DEFINITIONS

7.8.1.1 Accident

Any unplanned event, arising out of, and in the course of, an Eskom or contractor employee's employment and resulting in human injury, illness, or death of the employee, as well as death of, or injury to, any member of the public or damage to property.

CONTROLLED DISCLOSURE

7.8.1.2 Incident

An event that could or does result in harm or damage to people, property, processes and/or environment.

7.8.1.3 Lost Time Injury

A work injury, including impairment and a fatality, that arises out of, and in the course of, employment and that renders the employee or contractor unable to perform his/her regular/normal work on one or more full calendar days or shifts other than the day or shift on which the injury occurred.

Note: Normal work refers to any work where a person can perform his/her normal duties without restriction. Lost-time injury will apply if a person is booked off work by a medical practitioner due to an incident, including being booked off for acute stress or post-traumatic stress disorder by a relevant medical practitioner.

A lost-time injury includes the following:

- a) All bone fractures will be classified as a lost-time injury if a person has been booked off by a medical practitioner and/or when the restricted-duty/light-duty period is longer than seven (7) days.
- b) Any incident that occurs while an employee is off duty and where he/she, because of the situation at that time and his/her expertise, puts himself/herself on duty in order to save a life, or to protect Eskom's property, or to conduct any duty during an emergency situation, in this way furthering Eskom's business. Such an incident will be regarded as a lost-time injury.
- c) All restricted / light duty incidents longer than seven (7) days will be regarded as lost-time injuries.

7.8.1.4 Lost Time Incident Rate (LTIR)

The LTIR is a proportional representation of the work related fatalities, lost-time, excludes the Occupational Diseases and Third Party at Fault incidents (incidents including any motor vehicle or crime-related incidents ascribed solely to another party being at fault), and all passengers in commuting incidents. It is used internationally as an indicator or measure of health and safety performance. The figure 200 000 refers to the average number of hours worked by 100 employees in one year. The LTIR reflects a rough estimate of the percentage of the workforce that suffered a lost time injury incident based on a 12-month moving index.

7.8.1.5 First-Aid Treatment Case (Minor Injuries)

An incident that resulted in a work-related injury that requires first aid treatment within the scope of a first aider and content of a first aid box and does not require further treatment by a medical professional. Therefore, the following will be regarded as first-aid treatment case:

- a) No medication is required.
- b) No subsequent medical treatment is required.
- c) First-aid treatment can also be offered by a medical professional as long as it is in the scope of the first aider.

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d) Where an employee was involved in an incident where there was contact with the person's body resulting to visible or no visible injury (for example, pain), the involved employee must at least be assessed by a first aider / medical professional. The incident must be classified at least as a first-aid injury.

e) The affected employee is able to resume work after the injury has been treated.

Note: Classification is based on the level of treatment, not on the person administering treatment. For example, medical practitioners or emergency teams can provide first-aid treatment.

7.8.1.6 Occupational safety near-miss incident:

Any OHS event that did not result in human injury, illness or damage but had the potential, under different circumstances, to cause human injury, illness or damage.

7.8.1.7 Near-miss occurrence

An OHS event where a person is exposed to a single or combination of occupational hygiene hazards, which occurred in the work environment, due to failure / insufficient / absence of control measures for that hazard(s) that could result in medical treatment, impairment or an occupational disease / illness.

7.8.1.8 Property damage incident

Damage to Eskom's assets.

7.8.2 WHY MUST WE REPORT ALL INCIDENTS / ACCIDENTS?

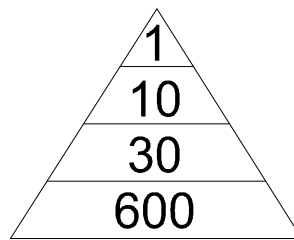
- Section 14 (e) of OHS Act requires that if an employee is involved in an accident which may affect his health or which has caused an injury to himself, report such incident to his employer, or his health and safety representative, as soon as practicable but not later than the end of the particular shift during which the incident occurred.
- You are obliged to report every accident, incident, injuries – minor or major and near misses. This must be reported to your appointed first aider, SHE rep or supervisor in your working area. Their names will be displayed in your workshop area.
- All injuries must be reported immediately to your supervisor, preferably on the same day or shift (8 hours or 12 hours).
- If an injury results in a serious medical condition afterwards, the Compensation Commissioner may refuse to pay if it was the result of an on-job injury, if the injury was not reported timeously.
- The necessary forms must be filled in when an accident, incident, near miss or injury occurs.
- All accidents and incidents with a priority rating of high or extreme and adverse trend will shall be investigated by the supervisor and the SHE representative concerned. All the necessary documentation for the accident /incident shall be completed and submitted to Occupational Hygiene and Safety (OH&S) Offices.

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- Serious accident / incidents will be investigated by a panel specially convened by the OH&S group for this purpose. In the event of a serious accident, the site of the accident may not be disturbed without the permission of the Safety Risk Manager (SRM).
- All significant incidents investigated shall be tabled at the SHE Steering Committee meeting where the entire accident will be reviewed. Precautionary measures will be evaluated to establish their effectiveness.

7.8.3 ACCIDENT RATIO STUDY

It has been statistically proven that for every major injury, there are 10 minor injuries, 30 property damage accidents and 600 near miss accidents with no visible injury or damage. Near misses go undetected if they are not reported.



The 1: 10: 30: 600 ratios indicate quite clearly that one of our major safety thrusts should be to encourage personnel to report near miss incidents. This will provide a sound basis for preventing accidents, down grading losses and instituting effective control.

7.8.4 CAUSES OF ACCIDENTS / INCIDENTS

Studies have shown that accidents / incidents are caused by:

- Human error: 88%
- Unsafe conditions: 10%
- Acts of nature / providence: 2%

As can be seen most accident / incidents are caused by unsafe acts of people.

In order to overcome this problem we need to be ever alert to dangers associated with each job, the possible effects of our actions and most important do forward planning.

All accidents can be prevented! Therefore:

S = Stop

T = Think

A = Act

R = Review

7.8.5 ACCIDENT PREVENTION

It is the aim of Koeberg to achieve the objectives described in its SHEQ policy statement. Employees are expected to contribute toward these objectives by:

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- Undergoing SHE induction at their workplace to make them aware of hazards in the workplace and safe work procedures to be followed.
- Attending prescribed SHE training / awareness courses.
- Obeying all SHE rules and procedures.
- Carrying out lawful orders given in the interest of SHE.
- Taking reasonable care for his/her health and safety and that of persons who may be affected by his/her acts or omissions.
- Reporting any situation which is unsafe, unhealthy or environmentally unfriendly as soon as possible to his/her supervisor or SHE representative.
- Not wearing loose outer clothing when working near moving machinery. Persons with long hair must wear hair caps.
- Reporting any injury or incident which may affect his/her health to his/her supervisor no later than the end of the particular shift during which the occurrence occurred.
- Ensuring that fellow employees obey all SHE rules and procedures.
- Avoiding and not partaking in any form of horseplay while on site or travelling in transport provided by the company.
- Only working on machinery if authorized to do so.
- Ensuring that anything which is provided in the interest of SHE is not intentionally or recklessly interfered with.
- Remaining at his/her post if he/she is operating a machine which requires constant attention in order to avoid accidents and not operating such machinery if his/her supervisor is not present.
- Entering and leaving the plant along defined walkways and roads and not taking short cuts.
- Only entering workshops or hazardous areas if they have permission to do so.

7.9 CRITICAL TASKS

Some activities performed on site will require special instructions. These activities are known as Critical Tasks and can be defined as a task which has the potential to produce major loss to people, equipment, process or the environment when not performed correctly. These activities are documented as Critical Task Procedures.

A Critical Task Procedure is a step-by-step description on how to perform a potentially hazardous activity in a safe manner.

Staff in each group must be trained on all the Critical Tasks that form part of their work.

Consult with you SHE Representative / Supervisor to inform you of:

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- Critical Tasks Procedures in your group / area:

Ask for the specific Critical Tasks that you would use in your area so that you can understand and would be able to do your work safely. All Critical Tasks relevant to your group will be listed in your groups Critical Task Inventory available with your SHE representative.

- Critical Task Procedure Training:

In order for you to understand and carry out any Critical Tasks in your area, you shall first receive training. This will be organised by either your supervisor or Group Head and must be done as per Section 8 of the OHS Act.

- Critical Task Observations:

In order to ensure that Critical Tasks are being performed correctly, from time to time your supervisor must perform Critical Task Observations when you perform a Critical Task.

For more information on Critical Task Procedures, reference KGA-096: Critical Task Guide

7.10 OCCUPATIONAL HYGIENE STRESSES

Workers must be aware of occupational hygiene stresses in the workplace.

The environmental factors or stresses that may cause illness, impaired health, discomfort or inefficiency in workers may be classified as chemical, physical, biological, ergonomic and psychological. These factors / stresses are mainly evident in the following groups.

- Chemical factors,
- Physical factors,
- Psychological factors,
- Biological factors,
- Ergonomic factors.

7.10.1 Chemical Factors

Chemical factors comprise the largest group by far. It includes dust, a multitude of acids and alkalis, gases such as oxides of Sulphur, carbon and nitrogen, heavy metals such as lead, mercury and a long list of toxic substances such as pesticides, solvents and preservatives.

Before these chemical substances can cause any harm, they must enter the body.

There are three main ways in which they may enter the body, i.e. inhalation, ingestion and absorption through the skin. Sometimes it may even enter the body directly, such as through a cut or sore.

The most important of these is inhalation because of the speed with which toxic substances are absorbed from the air, entering the blood stream.

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Types of Air Contaminants

- **Dust**
Small solid particles generated by handling, crushing, etc., of organic or inorganic materials. Dust does not diffuse in air, but settles under the influence of gravity,
- **Smoke**
An air suspension of particles often originates from combustion. Carbon or soot particles result from the incomplete combustion of carbonaceous materials,
- **Fumes**
Solid particles generated by condensation from a gas, generally after volatilization from a molten metal. Fumes may flocculate and form larger particles,
- **Mists**
Suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming or atomizing. Mist is formed when a finely divided liquid is suspended into air,
- **Gases**
Gases are a state of matter in which the material has a very low density and viscosity and can expand and contract greatly in response to changes in temperature and pressure,
- **Vapors**
The gaseous form of substances, which are normally in the solid or liquid state at room temperature and pressure,
- **Aerosols**
This describes any substance suspended in the air. All of the above-mentioned air contaminants can, therefore, be called aerosols.

7.10.2 Physical Factors

Physical factors include noise, vibration, temperature extremes, ionizing and non-ionizing radiation, microwaves, illumination and abnormal atmospheric pressures. Although it might sometimes be more difficult to observe the effect of physical stresses on human beings, they may, in some cases, cause severe damage. For example, noise not only causes hearing disablement but it also affects sleep detrimentally and reduces man's general feeling of well-being. Microwaves cannot be seen or felt, but can cook human flesh.

7.10.3 Biological Factors

Biological factors include insects, moulds, fungi and bacterial contamination encountered in the work place. Places especially susceptible are those where food is processed and equipment such as air-conditioning systems.

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7.10.4 Ergonomic Factors

Ergonomic stresses include improperly designed tools or work areas. Improper lifting or reaching, poor visual conditions or repeated motion in an awkward position may be responsible for accidents and inefficiency workers in the occupational environment.

Design the tools and the job to be done to fit the man should be of prime importance. (Of special concern is the problem of back injuries due to incorrect handling of heavy objects – proper lifting equipment of good lifting techniques should be used).

NOTE!

You must ensure that you are aware of occupational hygiene stresses in your work area.

Special precautions may have to be instituted to protect you against certain stresses and a hazardous exposure profile needs to be completed for each worker. Do not attempt a job if you are not aware of the hazards involved and the protective measures to be instituted.

7.11 HAZARDOUS LOCATIONS

Consult with your SHE Representative for the list of chemicals used in your area. All employees must be trained in the precautions when handling these chemicals.

Hazardous area (on account of explosive gas atmospheres) an area in which an explosive gas atmosphere is or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment.



Hazardous Location - Any Three Dimensional Area where there may be a significant risk of the ignition of gas, dust or vapour and hence an explosion.

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Zone 0 Location – Area in which an explosive gas atmosphere is present continuously or for long periods of time (frequently) (> 1000 h/y).

Zone 1 Location – an explosive gas atmosphere is likely to occur in normal operation (occasionally) (10 -1000 h/y).

Zone 2 Location – an explosive gas atmosphere is not likely to occur in normal operation, and if it does occur, is likely to do so only infrequently and to exist for a short period only (< 10 h/y).

Hazardous Location - Area where there may be a significant risk of the ignition of gas, dust or vapour and hence an explosion.

Zone 20 – Zone 20 locations are those in which combustible dust, as a CLOUD, is present CONTINUOUSLY or FREQUENTLY, during normal operation, in SUFFICIENT quantity to be capable of producing an EXPLOSIVE concentration of COMBUSTIBLE dust MIXED with air, and/or where layers of dust of UNCONTROLLABLE and EXCESSIVE thickness can be formed.

This can be the case inside DUST CONTAINMENT areas where dust can form EXPLOSIVE mixtures frequently or for long periods of time. Occurs INSIDE equipment.

Zone 21 - Zone 21 locations are those NOT classified as Zone 20 in which COMBUSTIBLE dust, as a CLOUD, FREQUENTLY or for long periods occur during normal operation, in SUFFICIENT quantity to be capable of producing an EXPLOSIVE concentration of COMBUSTIBLE dust MIXED with air.

Locations where conductive (e.g. Metallic) dusts could be present.

Zone 22 – Zone 22 locations are those NOT classified as Zone 21 in which COMBUSTIBLE dust CLOUDS may occur INFREQUENTLY and persist for only a short period, or in which accumulations or layers of combustible dust may be present under abnormal conditions and give rise to combustible MIXTURES of dust in air. Where, following an abnormal condition, the removal of dust accumulations or layers cannot be assured the area is to be classified as Zone 21.

Note: the following must be considered if classified as Zone 21 – positioning of electrical machinery relative to a dust – producing plant; normal cleaning procedures; and, other factors that might influence the occurrence or accumulation of dust.

My Responsibilities before entering a HAZLOC area:

- When performing work, ensure all equipment used is of the approved type i.e. spark free tools, intrinsically safe torches, oxygen monitors and test equipment.
- Obey all signage as indicated in a demarcated HAZLOC Area.

NOTE! Ensure that Pre-Job Brief highlights safety prerequisites and precautions from the working procedures and Critical Task Procedures

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7.12 NUCLEAR EMERGENCY PLAN

A large release of radioactive material from Koeberg is highly improbable, but for the purpose of emergency planning we have a plan to assure your safety and the safety of the general public / environment.

Full implementation of this plan is only necessary in the event of a major nuclear emergency. The plan is intended to cover those occurrences which have, or may potentially have, radiological consequences to personnel on site and / or to the general public surrounding the site.

7.12.1 ACTION ON HEARING ALARM SOUNDS

There are several sounds used at Koeberg:

A) NUCLEAR EMERGENCY

- Alarm Sound,
- Slow “Whoop-Whoop” plus PA announcement,

Your Personal Action:

- Report to your supervisor in person.
- Escort visitors to Security at ACP2.

B) FIRE

- Alarm Sound,
- Two-tone “Hi-Lo”.

Your personal Action:

- No action, unless you are a fire team member, or are in an area affected by the fire, in which case evacuation, or act as directed.
- Information on alarms and instructions are posted throughout the plant and on the localised radiation alarms.

7.12.2 CLASSIFICATION ON NUCLEAR EMERGENCIES

There are four levels of Emergency conditions at Koeberg Nuclear Power Station.

A) UNUSUAL EVENT

- An abnormal, unplanned event that requires partial activation of the Emergency Plan in order to bring the situation under control.

B) ALERT

- A situation exists which, if not correctly controlled by station staff, has the potential to develop into a Site or General Emergency (Threat or loss of 1 Fission Product Barrier).

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C) SITE EMERGENCY

- An emergency exists which does not pose serious radiological hazard to the environment beyond the site boundary or to the health and safety of the general public. (An emergency is declared for the site only –based on the threat or loss of 2 Fission Product Barriers).

D) GENERAL EMERGENCY

- An emergency condition exists which poses or potentially poses a serious radiological hazard beyond the site boundary. (An emergency is declared off-site as well – based on the threat or loss of all 3 Fission Product Barriers).

E) EMERGENCY CONTROL CENTRE

- The Emergency Control Centre is the hub of the Koeberg Emergency organization. The Emergency Controller is in charge of the overall emergency situation. The Emergency Control Centre Team will direct all emergency response activities and liaise with supporting offsite organizations, the press and the public. The Emergency Control Centre is designed to remain habitable throughout the course of an accident
- Even if the site has to be evacuated. The ECC is situated beneath ACP2. An alternative centre exists at Bellville in the Eskom Bellville Head Offices.

7.13 WHAT TO DO IF YOU DISCOVER AN EMERGENCY**7.13.1 What is an Emergency?**

It should not be too difficult to think of some shattering condition that would leave no doubt in one's mind as to whether or not we have an emergency. Consider, however:

- a fire,
- a person suffering from a heart attack,
- a person immobilized due to a fall.

Consider an emergency to be any condition where some form of assistance is required, e.g. fire team or first aider may be required at short notice.

7.13.2 In an emergency, your action should be the following:

- Notify the Control Room on ☎4222 / 7911.
- Give clear information regarding:
 - the nature of the emergency
 - the magnitude of the emergency
 - the location of the emergency
 - the type of assistance required

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- Identify yourself and give your contact number
- Stand by to direct the responding team to the location. While notifying the Control Room (who will summon assistance over the public address system) arrange to meet the responding team at an easily identifiable location in the vicinity of the emergency, and guide them to the area where the emergency occurred.
- Raise a local ALARM. Warn people in the vicinity who may be affected by the condition and / or may be of assistance
- Render assistance only if it is safe to do so. Remember, any nature of toxic substance could be present and it would be foolhardy to rush into a situation without the necessary protective equipment.
- Evacuate the area should the need arise.

NOTE! Remember, it is far better to call for trained and qualified assistance rather than tackle a situation on one's own, only to find out that one cannot cope with the situation or expose oneself unnecessarily to a hazardous condition.

7.14 MUSTER POINTS

In the event of a Nuclear Incident at Koeberg the Emergency Plan will be put into operation. All staff will be made aware of this by the sounding of the Nuclear Emergency alarm and a public address system announcement. Staff must follow the public address directions and if possible go to their muster stations. Make sure you are aware of where you must muster.

Once all personnel have been accounted for the Muster Supervisor, or designated person will report to the Muster coordinator confirming all persons have been accounted for.

If you are unable to report to your muster station you should report to the nearest one and inform your muster supervisor as soon as possible.

It is very important to listen to the public address system and follow the instructions given. Do not use the lifts or telephones.

NOTE: Exercises are carried out from time to time to ensure this process works. Treat all exercises seriously!!

7.14.1 MUSTER AND ACCOUNTABILITY

In the event of a nuclear incident, the Shift Manager will sound the nuclear alarm and make an announcement over the Public Address System. This reaches all locations on site. Part of this announcement will be an instruction to all personnel to report to their muster stations. Supervisors will account for all personnel.

Upon declaration of a nuclear incident:

- All contractor personnel will report to their Supervisors, who will in turn report the muster coordinator.
- Visitors to report to Security at ACP2 (or the Emergency South Gate if directed to)
- Visitors must be escorted by their hosts after the hosts have reported to their own muster stations.

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NOTE: *Personnel undergoing training shall report to their instructor, who, in turn will report accountability to the head of that Training Group. Everybody must remain at their muster stations and await further instructions over the PA system.*

Due to radiological or other conditions an announcement may request certain personnel to muster in location other than their pre-determined one. They shall proceed to their new muster location immediately. Accountability lists should be completed again once staff has arrived in their new location.

7.14.2 SITE EVACUATIONS

Should the Emergency Controller or Shift Manager consider it necessary to evacuate the site of all non-essential personnel, an announcement will be made over the PA system. A site announcement shall detail the evacuation procedure.

All personnel shall muster and supervisors shall complete their particular accountability lists prior to evacuation.

Personnel shall endeavor to leave the site by the same means of transport by which they arrived. Buses will be available to convey personnel from the site exit via either ACP2 or the Emergency South Gate to an off-site assembly point.

7.14.3 SPECIAL PRECAUTIONS DURING EMERGENCIES

7.14.3.1 Permits-to-work

- As soon as an Emergency is declared, all permits-to-work are suspended.
- All electrical equipment to be safely isolated.
- Do not use lifts or hoists.
- Loss of electricity supply would leave you trapped and create a problem.

7.14.3.2 Contamination

- During an emergency, if a release of radioactive material has occurred, contamination may be present in areas which are normally contamination free. The wind direction will usually affect the contamination of clean areas.

7.14.3.3 Protective Equipment

- Instructions regarding the use of protective clothing and respirators will be issued by the Radiation Protection Group as appropriate.

7.14.4 WARNING ALARMS

- Nuclear emergency – slow rising whoop siren tone.
- Fire alarm – Two tone (hi-lo).

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- All clear – repeated gong.
- Radiation alarms:
 - Malfunction : steady tone,
 - High alarm : wailing tone,
 - High-High alarm : fast whoop.

7.14.5 NUCLEAR EMERGENCY

- Walk to your muster station,
- Visitors to be escorted to security at ACP2,
- Follow public address system instructions,
- Telephone should be used by emergency teams only,
- Remain Indoors,
- Do not evacuate unless instructed.

7.14.6 FIRE EMERGENCY

- Report all fires to the control room - ☎ 4222 / 7911.
- Attempt to extinguish fire if safe.
- Relocate to a safe area, but remain in the vicinity to direct fire teams.
- Do not use lifts.
- Follow public address system instructions.

7.14.7 RADIATION ALARMS

- Detector locations are inside shielded rooms.
- Radiation detector read-outs are in hallways.
- Note alarm tone, instrument number and location.
- Report all radiation alarms to control room - ☎ 4222 / 7911.

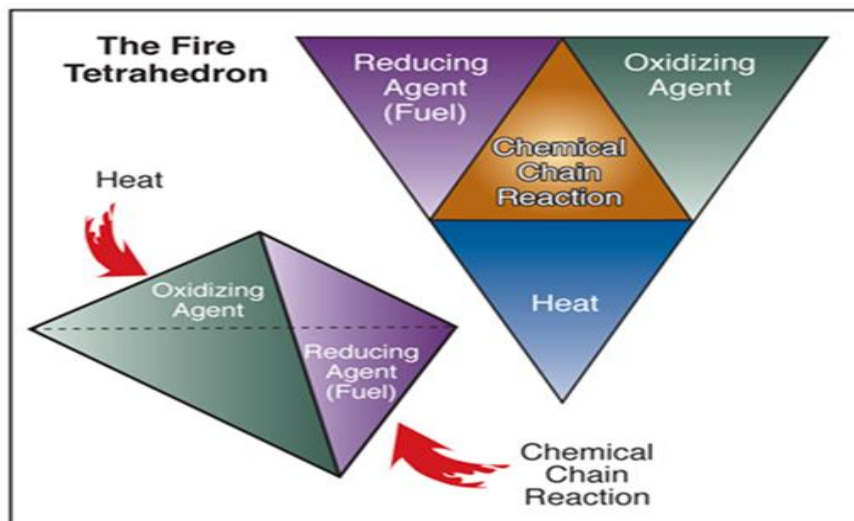
7.15 FIRE HAZARD**7.15.1 CHEMISTRY OF FIRE**

Three elements must be present to cause and sustain a fire:

- Oxygen (Air),
- Heat,
- Combustible substances (Fuel).

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The required elements can be represented by a triangle known as the triangle of combustion.



If any one side of the triangle is removed, the triangle will collapse, and the fire will be extinguished.

In order to extinguish a fire one only needs to cool it below combustion temperature, eliminate the supply of oxygen or remove the fuel. This represents removal of one of the elements thus breaking off the chain reaction.

However, in practice it is not that easy. Oxygen is available in the air around us and makes it very difficult to remove. To remove the fuel can sometimes be impossible, e.g., a burning building. To cool it seems to be the most obvious solution and, therefore, water or water and foam is mostly used to fight fires.

7.15.2 FIRE EQUIPMENT

Fire extinguishers are provided throughout the plant. The types in use are:

- Dry Chemical Powder Extinguishers (DCP Extinguisher)
- CO2 type Extinguishers

Dry Chemical Powder Extinguisher (DCP Extinguisher)

This type of extinguisher can be used on all types of fires. The method of operation is to remove the safety clip from the handle arrangement, point the nozzle at the base of the flames and squeeze the handle grip.

This type of extinguisher is safe to use on all fires, general, electrical or fuels and oils, but it should not be used on delicate electrical equipment such as computers as the powder will cause damage. For computer fires the carbon dioxide extinguisher should be used.

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Carbon dioxide (CO2) Extinguisher

This type of extinguisher can be used on all types of fires. The method of operation is to remove the safety clip from the handle arrangement, point the nozzle at the base of the flames and squeeze the handle grip while sweeping the handle from side to side still being pointed at the base of the flames.

NOTE: *All employees must undergo Fire Extinguisher Training every 5 years.*

Fire Hose Reel

Fire hose reels are located at strategic places in buildings to provide a reasonably accessible and controlled supply of water for fire extinguishing.

7.15.3 FIRE PROTECTION SYSTEMS

It is the responsibility of all staff to ensure that after passing through a fire door, the fire door is properly closed behind them. All fire doors must be treated with respect to prevent damage to the door. Trolleys or other equipment must never be used to push open a fire door. In view of the importance of this protective requirement any contravention of these rules will be dealt with in terms of the Eskom disciplinary code.

If fire doors are found to be defective it must be reported immediately by raising a priority 2 defect on SAP to MWDR. Blocking or preventing the closing of fire doors is illegal and will not be tolerated. Some fire doors form part of an escape route and must always be kept clear and free of obstructive material.

There are fire doors throughout the plant. These doors must never stand open for any reason unless there is a fire watch in place monitoring the area. Except the fire doors leading to the ASG pump rooms which serve as 'Fire Dampers.'

Throughout the plant various smoke, flame and heat detectors are installed. These detectors are all linked to an alarm board which would indicate if such an alarm has been activated.

Responding to such an alarm would be a fully trained fire team from any of the departments under guidance of a Fire Officers.

In addition to alarms being activated, the fire detectors can also set off an automatic fire system, for example; deluge water spray system, gas system, etc. Care must be taken not to do any hot work in areas where a fire system is located unless the area has been declared safe to do so.

7.15.4 HOT WORK

Any work involving cutting, welding, grinding, soldering equipment (also includes, but is not limited to, the use of heat or spark producing equipment which could include thawing pipes, torch-applied roofing, and cad welding).

7.15.5 FIRE IMPAIRMENT.

A condition where a fire protection system or unit or portion thereof is out of order and the condition can result in the fire protection system or unit not functioning in a fire event.

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7.15.6 FIRE IMPAIRMENT PLAN

It is a process to follow in order to impair fire protection systems. Maintenance or repair work to fire protection systems must be returned to their normal operating condition in the shortest possible time. All work undertaken shall be on a work to completion bases.

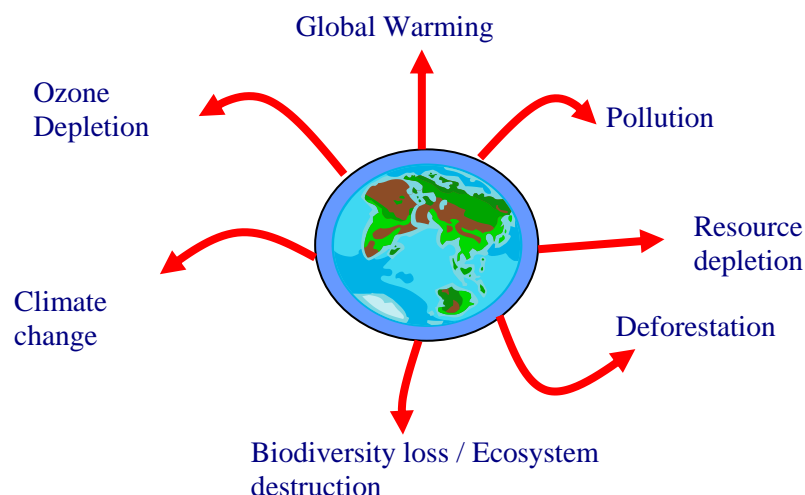
7.16 THE ENVIRONMENT

The environmental law in South Africa protects the rights of its people and the environment in a sustainable manner. In the Constitution of South Africa, Act No. 108 of 1996 it is stated in section 24 that: "Everyone has the right

- a) to an environment that is not harmful to their health or well-being, and
- b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
 - prevent pollution and ecological degradation;
 - promote conservation; and
 - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development

Environmental management is not about the management of the environment by an environmentalist, but rather about the organisation controlling and managing its activities that have or could have an impact on the environment. There have been various impacts of growing populations and increased industrialization.

[NOTE: Reference to Legal Requirements not limited to those listed]



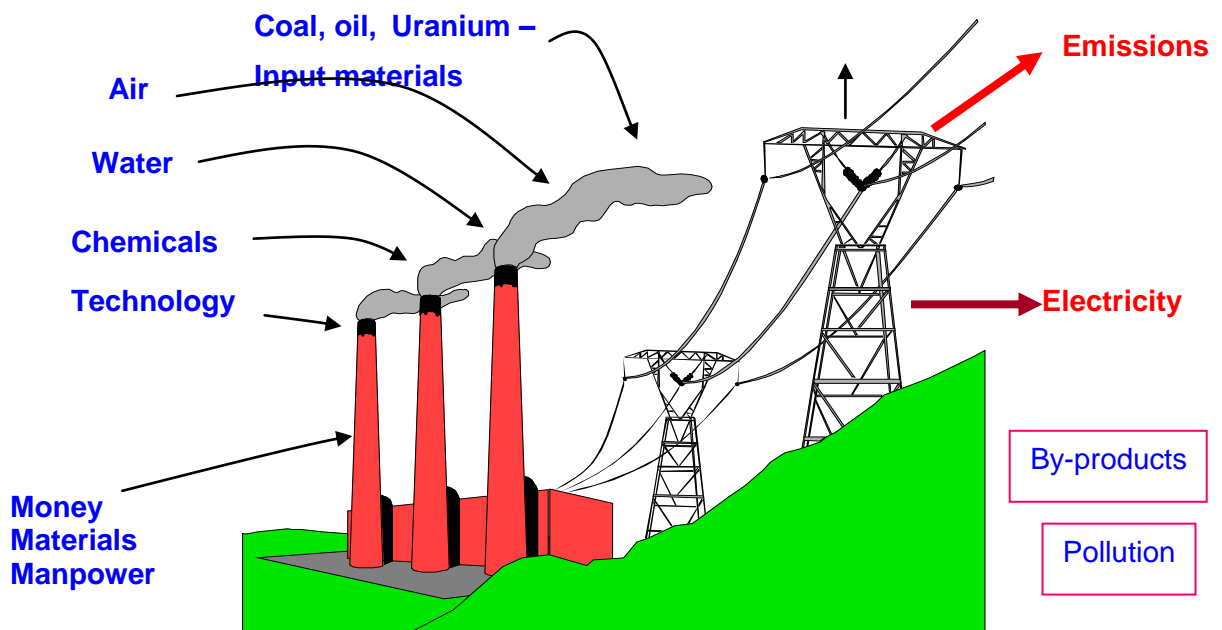
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7.16.1 ENVIRONMENTAL IMPACTS ASSOCIATED WITH POWER GENERATION

The two most challenging components of an environmental management system are the identification and development of the aspects and impacts and the determination of their significance.

An aspect can be defined as an element of the organisation's activities, products or services that can interact with the environment. The impact is then any change in the environment, whether adverse or beneficial, wholly or partially resulting from an organisations activities, products or services.



The figure above shows some of the environmental impacts associated with the energy industry. These impacts can be divided into 4 categories:

- **Air impacts** - Particulate and gaseous emissions.
- **Water impacts** - Surface and ground water pollution due to effluent discharges, chemical spillage, oil spills, illegal dumping of solid waste.
- **Waste Impacts** - Domestic waste, medical waste, hazardous waste and nuclear waste.
- **Land impacts** - Soil erosion, land use, soil pollution due to chemical/oil spills, alien vegetation and top soil loss.

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7.16.2 POLLUTION

Pollution can be found in three places: air, water and on land. Human activity can release harmful or poisonous substances that can cause harm to humans, other animals and plants. Industries can release gases that pollute the air and can release chemicals that pollute rivers, lakes and the sea.

Legal reference:

National Environmental Management Act 107 of 1998

General principles for sustainable development include *inter alia* the use of the best practicable environmental option, the avoidance, minimisation and remediation of pollution and degradation of the environment, as well as the polluter pays preventative and precautionary principles

7.16.3 WATER MANAGEMENT

South Africa is a water scarce country and as such Koeberg needs to ensure that its impact on this natural resource is minimised. There are various impacts of water reuse and water discharge. Resource depletion is the most notable one. The impact of returning contaminated water into the environment as well as water of inferior quality will have a major impact on the aquatic life, as well as the surrounding environment and populations.

Legal reference:

Section 19 & 151 of the National Water Act 36 of 1998

KNPS must take "reasonable measures" to prevent the pollution of a water resource from occurring, continuing or recurring, e.g. oil, toxic releases to water including radiological emissions, herbicides etc. Reasonable measures are defined as including the control of sources of pollution, containment of pollutants and remedial obligations in instances where pollution did occur. These obligations apply to both surface and groundwater.

Section 22(2)(d) of the National Water Act 36 of 1998

The National Water Act prohibits water wastage. This implies that KNPS must be able to demonstrate optimal use of water, and must also be able to detect water losses.

City of Cape Town Wastewater and Industrial Effluent Bylaw of 1 September 2006 & Cape Town Storm Water Management Bylaw

Industrial wastewater to sewers

KNPS may not discharge any industrial effluent into the municipality's sewage disposal system without their prior written permission.

Prohibited discharges to storm water systems

Nothing other than uncontaminated rainwater is allowed to enter the storm water system.

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7.16.4 WASTE MANAGEMENT

Koeberg has committed to a cleaner environment by ensuring a workable waste management system and has confirmed this commitment in the SHEQ policy. There are various reasons why we need to manage our waste, the most important being that we need to prevent depletion of the earth's resources and keep within the carrying capacity. This is the principle of sustainable development.

The main product that is manufactured is electricity. The wastes that are produced during the power generation process can be grouped into 5 groups:

- Solid:** Solid waste and broadly defined solids, semisolids
- Liquid:** Sewage, effluent and wastewater. However, once wastewater is treated and various residues are extracted from the water to form sludge, the sludge is usually treated as solid waste.
- Gas:** During activities certain gases or vapours are released into the atmosphere that may also be harmful to the environment. These gases are then classified according to their pollution potential, atmospheric fate and residence time.
- Domestic:** Includes garbage as well as sewage or waste from septic tanks.
- Hazardous:** Wastes that is particularly dangerous or destructive. It is important to note that hazardous waste can be in a solid, liquid or gas form and are harmful to both the environment as well as humans.

At Koeberg, a wide variety of waste is generated, for example, domestic/general waste, metals, asbestos, garden refuse, oil, hazardous waste, PCBs, paper, fluorescent tubes, medical wastes, chemical waste, printer cartridges and building rubble. Waste is managed in accordance with procedure KAE-012.

Legal reference:

Section 20(9), Environment Conservation Act of 1989, read with Department of Water Affairs and Forestry's Minimum Requirements for the Handling, Classification and Disposal of Waste, Second Edition, 1998

Waste generators are legally obliged to dispose of waste at appropriately permitted facilities only.

Section 16(1), National Environmental Management: Waste Act 59 of 2008.

KNPS must take all reasonable measures to —

- (a) Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;
- (b) Reduce, re-use, recycle and recover waste;
- (c) Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
- (d) Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;
- (e) Prevent any employee or any person under his or her supervision from contravening this Act;
- (f) Prevent the waste from being used for an unauthorised purpose.

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7.16.5 HAZARDOUS WASTE

Hazardous waste is waste that has the potential, even in low concentrations to have a significant adverse effect on public health and the environment due to its toxicological, chemical and physical characteristics. Hazardous waste is substances that are usually chemically reactive, toxic, corrosive or flammable. Examples of hazardous waste at Koeberg are, PCB containing oil, oils, fluorescent tubes and asbestos.

Regardless of treatment methods, there is always a residue of hazardous waste that needs to be disposed of on land. Options available for disposal on land include:

- Secure or lined landfills – the most practicable and common option. Minimum requirements for waste disposal by landfill are based on the concept that landfills have to be properly sited, investigated, designed, and developed, operated, monitored, rehabilitated and closed.
- Encapsulation facilities – used for the most hazardous wastes. Wastes are placed in drums and then encapsulated in concrete. Non-metallic drums can be used to eliminate the corrosion risk of metal drums. The facilities are built with their own monitoring systems. The control and recording of the location of placement of the different types of waste is very carefully monitored.

7.16.6 NUCLEAR WASTE

Nuclear waste can be characterised into three levels:

- Low Level Radioactive Waste (LLW),
- Intermediate Level Radioactive Waste (ILW),
- High Level Radioactive Waste (HLW).

Koeberg operational waste (low and intermediate level waste) is temporally stored at Koeberg before being transferred to Vaalput for final disposal.

The drums are placed in a concrete lined pit to a depth of approximately 5 meters. The drums are then covered with a layer of compacted clay and then topsoil (approximately 2 meters).

High level radioactive waste is the residue left over when spent fuel has been chemically processed to remove usable uranium and plutonium, or it is the spent fuel itself if it is intended not to be reprocessed and is designated as a waste. It is placed in interim storage either under water or in shielded containers such as steel flasks. The eventual disposal is likely to be deep (500-1000 meters) underground geological disposal. At present no decision has been made on this. The recently promulgated Nuclear Policy will give guidance on this in the future.

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Legal Reference:

Section 21, National Nuclear Regulator Act 47 of 1999

Radioactive substances that form part of the nuclear fuel cycle are regulated by the National Nuclear Act of 1999

7.16.7 LAND MANAGEMENT

There are various aspects associated with land management. Our water resources, as well as that of adjacent communities such as Atlantis, need to be protected. In order to accomplish this, weeds and invader plants such as Rooikrans and Port Jackson trees need to be controlled. These use vast quantities of water.

Legal Reference:

Regulation 15 GN 1048: Declared weeds and invader plants Conservation of Agricultural Resources Act 43 of 1983

In terms of the Conservation of Agricultural Resources Act, certain plants are declared weeds and invader plants. These species are divided into three categories, each being subject to different control measures.

Where Koeberg's activities cause disturbance or denudation of any land, it is required to restore such land by means of soil conservation measures.

Damage to protected flora is prohibited.

Legal Reference:

National Forests Act 84 of 1998, National Environmental Management: Biodiversity Act of 2002 & Cape Nature and Environmental Conservation Ordinance 19 of 1974.

The Minister of Water Affairs and Forestry as well as the Minister of Environmental Affairs and Tourism and the provincial nature conservation authority identified flora that may not be damaged, destroyed or removed without a permit.

The picking and sale of protected flora are also regulated by the Cape Nature and Environmental Conservation Ordinance.

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Table 1: lists the various aspects that can be identified with their resulting impacts

Waste	Domestic refuse	Leachate high in organic concentrations, chlorides, and sodium calcium, may pollute surface and ground water.	Approved contractors employed to treat and remove waste to approved and licensed waste handling facilities.
	Uncontrolled dumping and scrap yard	Surface and ground water pollution by leachates, soluble or suspendable chemicals and physical objects.	Monitoring procedures are in place to prevent overflows and spills.
	Hazardous waste	Uncontrolled dumping may cause an environmental disaster.	Audits carried out on waste handlers
	Oil, spilt traps & Oil spills	Overflow of traps during flooding can cause oil seepage to take place. Oils spills may results soil and water pollution.	
Water	Demineralisation plant	Effluent high in soluble salts etc. may cause surface and groundwater pollution if spillage or leakage.	Plant operations aim for compliance to permit conditions.
	Chemical and laboratory store	Chemicals i.e. sulphuric acid, caustic soda or ammonia spilled during handling and washed into storm water, polluting it, or otherwise damage the drains and contaminate water.	Safe handling procedures are in place, as dictated by the Materials Safety Data Sheets (MSDS). Continuous on-job training. Emergency spill kits available.
	Storm water drainage system	Malfunctioning could lead to pollution of surface water depending on the quality of the water.	Never dump, drain or pour any liquid other than water into any of the drain systems
	Sewage plant	Ground and surface water pollution through seepage/overflow of unprocessed water. Poor quality final processed effluent discharged could pollute surface water.	Sewage plant levels controlled to avoid overflow and contamination of surrounding areas. Proper process management.

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Table 1: Continues

Infra-structure and services	Security fences	Herbicides used to sterilise soil between security fences may pollute ground water.	Only environmentally friendly herbicides used for vegetation management.
	Landscape areas	Misuse of herbicides, pesticides and fertilisers may lead to the pollution of soil and ground water.	Use is limited to avoid contamination and sterilization of soil.
	Fire training area	Oil and fuel used during fire-fighting exercises may be spilt which will contaminate soil and groundwater.	Oil handling areas are bunded to capacity of 110%.
	Medical waste	Uncontrolled dumping of medical waste i.e. syringes, dressing and containers dumped may cause pollution and may result in health impacts.	Procedures in place to handle disposal of medical waste and chemicals by approved contractors
	Maintenance and workshop	Spilled chemicals, oils and grease may pollute surface run-off water.	Drains/containers in workshops to collect spilt oil.
Oil	Transformer oil, oil store, bulk oil	Oil spills cause soil and ground water pollution (seepage). Run-off from soil/other surfaces may pollute storm water.	Oil handling areas bunded with capacity of 110%. Oil traps/trays in case of spillage. Emergency spill kits available

7.16.8 ENVIRONMENTAL INCIDENTS

It is a requirement that all environmental related incidents that have the potential to pollute the environment (having a negative impact on the environment), including water, soil and atmosphere, whether these are contraventions of relevant environmental legislation or not, are reported.

The process and responsibilities for identifying, reporting and investigating and trending environmental incidents shall be in accordance with Procedure 240-133087117 Environmental Management Procedure.

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7.16.8.1 Notification and Reporting

All environmental incidents must be reported within 24 hours internally to all relevant stakeholders and externally to relevant interested parties affected by the incident as identified in terms of the site Environmental Management System (EMS). The readily available information must be used for the initial notification and reporting.

7.16.8.2 Environmental event:

All incidents that are not classified as an environmental legal contravention - incident and/or an environmental legal contravention – incident in terms of the OHD when the classification criteria are applied.

7.16.8.3 Environmental Incidents:

- **Hydrocarbon spill:** The release of liquid petroleum hydrocarbon (oil, diesel, jet fuel, etc.) spillage into the environment (includes soil and water) which could or does result in environmental damage, and/or pollution or degradation.
- **NEMA section 30 incidents:** An unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property.
- **NWA section 20 incident:** Includes any incident or accident in which a substance -
 - a) pollutes, or has the potential to pollute, a water resource or
 - b) has, or is likely to have, a detrimental effect on a water resource.
- **Wildlife incidents:** Birds, wild-game, non-domesticated animals, marine and freshwater fish. (Refer to the Wildlife Interaction and Management Standard 32-829).
- **Repeat Environmental incident:** Any environmental incident where there is clear evidence that the incident is of the same type and with the same cause(s) within the same OU/BU.

7.16.8.4 Classification of Incidents:

Environmental legal contravention – incident: An incident where a provision of environmental legislation (national, provincial, or local) and/or condition of an environmental approval (for example, environmental authorisation, water use license, waste licence, licence in terms of the National Forests Act) or any other legal document issued in terms of environmental legislation is contravened. (An environmental legal contravention – incident is considered a breach in terms of compliance reporting).

NOTE: Environmental legislation refers to legislation or legal requirements that has/have, or potentially has/have, an impact on activities interacting with the physical environment as defined in NEMA, including, but not limited to, events that result in either air pollution, sterilising the soil, or destroying rare, endangered, or protected fauna or flora (as set out in the NEMA: Biodiversity Act or provincial environmental ordinances) or result in making any water resource unfit for its original purpose, such as domestic, agricultural, or industrial use, or reduce the water quality to such a state that human intervention is required to restore it to its original quality.

7.16.8.5 Environmental legal contravention - incident in terms of the OHD: These are **specific cases of** environmental legal contravention- incidents that are considered to be of very high significance in terms of its environmental impact and/or Eskom in that they have a material business impact and illustrate a significant failure of business systems. Within the above principles they are identified in terms of the criteria below. If any one of the criteria specified in appendix C as well as the principle defined is relevant to a specific contravention of environmental legislation, then that environmental legal contravention - incident is a potential “environmental legal contravention - incident in terms of the OHD”.

Legal Reference:

National Water Act 36 of 1998
National Environmental Management Act 107 of 1998
National Environmental Management: Air Quality Act 39 of 2004
National Environmental Management: Biodiversity Act 10 of 2004
National Environmental Management: Waste Act 59 of 2008

Emergency incidents that could give rise to catastrophic environmental consequences must be reported to a list of regulatory authorities. Clean-up and remediation obligations are also imposed by these provisions.

7.16.9 USE OF A VEHICLE IN THE COASTAL ZONE

KNPS uses a vehicle in the coastal zone to carry out activities, i.e. marine sampling (Marine Ecological Studies). Persons who use a vehicle within the coastal zone must take all reasonable measures to avoid causing harm to the environment.

Legal Reference:

ESKOM is functionary of state envisaged in section 239(b)(i) of the Constitution and as such an “organ of state” for the purposes of GN R 1426.

GN Regulation 1426 to the National Environmental Management Act of 1998. Although the use of the coastal zone is regulated by the National Environmental Management Act of 1998, organs of state are allowed to use vehicles in the coastal zone in the execution of their public duties.

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Even though such vehicle use is permissible use, persons using such vehicles are still under the duty to avoid causing adverse impacts to the coastal environment. In terms section 58(1) of the National Environment Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008), read together with section 28(1) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), Duty of Care, *“Every person who causes, has caused or may cause adverse effect on the coastal environment must take reasonable measures to prevent such adverse effect from continuing, recurring or occurring or, in so far as such harm to the coastal environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such adverse effect on the coastal environment.”*

CODE OF CONDUCT for the use of vehicles in the coastal area in terms of the Off-Road Vehicle Regulations.

Any person who contravenes any provision of these regulations shall be guilty of an offence and liable on conviction to a fine up to a maximum of R500 000 per vehicle per offence, or to imprisonment not exceeding two years, or both such fine and such imprisonment.

7.16.10 NEW ACTIVITIES/MODIFICATIONS (EIA REQUIREMENTS)

The relevance of the environmental impact assessment regulations during the planning phases of all new projects/modifications must be considered. Before a project can start we have to assess whether or not the proposed activity falls within the ambit of the regulations, and which authorities are involved.

Legal Reference:

Section 24 of the National Environmental Management Act of 1998, read with GNR 325, 326 & 327.

Activities listed in GNR 325 & 327 to the National Environmental Management Act of 1998 may not commence without the prior written consent of the provincial environmental authority.

The permission may not be granted without the consideration by the said authority of an environmental report, submitted by the applicant in accordance with prescribed requirements.

Environmental Contact Numbers

- **Any Environmental matter:** Environmental Management – 4310,
- **Waste matters:** Horticulture and Waste Management Section – 4040,
- **Chemical/Liquid Waste:** Chemistry – 4570
- **Unknown Waste or Liquid:** Horticulture and Waste Management Section - 4040
- **Any Spillage:** Shift Manager – 4100; Environmental Management – 4310.

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NOTE: Oil observed in harbour contact Koeberg emergency number – 4222.

8. MEDICAL SERVICE / CENTRE

There is a medical centre on site, situated on the ground floor of the maintenance services building (MSB).

The centre provides the following service:

- Medical Surveillance job specific as per appointment,
- Medical Surveillance programs,
- Primary Health Care,
- Family Planning for repeat clients,
- HIV/AIDS Counselling and Testing,
- Incapacity & Disability Assessments and Management,
- Attend to all injuries on duty and report to COID when necessary,
- Employee Assistance Program,
- Bio kinetic Assessment (for proper placement to job, and rehabilitation),
- Station Psychologist.

Site appointed Medical Practitioner (to ensure that we comply with NNR requirements regarding Radiation Workers and License Operators medicals).

NOTE: Medical staff is on call 24hrs in case of an emergency.

9. AUTHORISATION

This document has been seen and accepted by:

Name	Designation
R. Behr	Safety Risk Manager
J. Kloppe	Environmental Manager
R. Barnes	Fire Risk Manager
V. Ntuli	General Manager

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10. REVISIONS

Date	Rev.	Compiler	Remarks
2019-11-11	4	C. Nel	The Manual was updated to replace the SHEQ Policy Poster image with the SHEQ Policy Poster link.

11. ACKNOWLEDGEMENTS

- 11.1 **Gamrone Adams** – Occupational Hygiene Assistant
- 11.2 **Melvin Van Rooyen** – SHE Officer
- 11.3 **Gert Karools** – SHE Assistant Officer
- 11.4 **Soraiya Isaacs** – OH&S Administrator
- 11.5 **Greg De Castro** – Fire Risk Management Official
- 11.6 **Andre Van Rooyen** – Fire Risk Management Instructor
- 11.7 **Leon Hendricks** – Fire Risk Management Official

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