ESKOM STANDARD

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TITLE: **THE SAFE USE OF PESTICIDES AND HERBICIDES**

COMPILED BY	FUNCTIONAL RESP.	AUTHORIZED BY
.....	.....	.....
Y Pillay	**C Buddingh** **OHM**	**Dr W J Kok** **ED (F)**

This document has been seen and accepted by

B T Crookes	**Executive Director (Generation)**
R S Dabengwa	**Executive Director (Electrification)**
P A Faling	**Executive Director (Transmission)**
H J Pienaar	**Executive Director (Services)**

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Introduction

The health and safety of workers and members of the public, and protection of the environment against pollution are important to Eskom. Pesticides and herbicides play a major role in agricultural practice, however, they are potentially hazardous to human and animal life if not used safely. Pesticides can also become environmental pollutants if not properly managed and used.

Pesticides and herbicides are applied to areas and vegetation by registered and competent pest control operators under strictly controlled conditions.

Eskom believes that:

— workers and members of the public must be protected against possible exposure to pesticides and herbicides which could adversely affect their health, safety and well-being;

— the natural environment must be protected against pollution caused by pesticides and herbicides;

— employees must be conversant with health, safety and other risks associated with pesticides and herbicides; and

— pesticides and herbicides should only be used and applied under strictly controlled conditions, by competent personnel, where other actions have failed to produce the required results.

This standard must be used in conjunction with Eskom's Herbicide Management Policy (ESKPBAAD4).

1 Scope

1.1 Purpose

To provide the minimum health, safety and environmental requirements during the buying, transport, storage, use and disposal of pesticides and herbicides.

1.2 Applicability

This standard is applicable throughout Eskom, to all employees and contractors.

2 Normative references

Conservation of Agricultural Resources Act, No. 43 of 1983. (as amended)

Environmental Conservation Act, 1982 (Act 100 of 1982). (as amended)

Hazardous Substances Act, 1973, (Act 5 of 1973). (as amended)

Occupational Health and Safety Act No. 85 of 1993. (as amended)

The Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947).

Water Act, 1956 (Act 54 of 1956). (as amended)

I.L.O. — Encyclopaedia of Occupational Health and Safety. (as amended)

SABS 072:1993, *The safe handling of pesticides.*

SABS 075:1981, *List of common names and classification of pesticides and other agricultural chemicals.*

SABS 0124:1977, *Application of certain soil insecticides for the protection of buildings.*

SABS 0133:1977, *Application of pesticides in food handling, food processing and catering establishments.*

SABS 0204:1985, *The application of fumigants.*

SABS 0206:1987, *Safety procedures for the disposal of surplus pesticides and associated toxic waste.*

SABS 898:1980, *General requirements for pesticides.*

SABS 1165:1977, *Chlordane emulsifable concentrates (soil insecticides).*

SABS 1328-1:1981, *Compression type sprayers, Part 1: Manually operated.*

SABS 1343:1985, *Insecticidal solid fumigants containing aluminium phosphide (food storage premises).*

ESKPVAAO5, *Occupational hygience risk assessment.*

3 Definitions

Unless indicated otherwise, the following definitions apply throughout this standard.

3.1 agricultural remedy: Any chemical substance or biological remedy, or any combination or mixture of any substance or remedy, intended or offered to be used for the destruction, control, repelling, attraction or prevention of any undesired microbe, algae, nematode, fungus, insect, plant, vertebrate, invertebrate or any part thereof.

3.2 pest control operator: A person who in the course of his trade or occupation administers agricultural remedies for the purposes for which they are intended.

3.3 pesticides: The word “pesticide” denotes a chemical substance (which may or may not be mixed with other substances) used for the destruction of an organism detrimental to man or to his interest. The word clearly has a very wide meaning, and includes a number of other terms (e.g. insecticides, fungicides, herbicides, rodenticides, bactericides, miticides, nematocides, molluscicides) which indicate the organism or pests a particular chemical or class of chemicals is designed to kill. Since different types of chemical agents are used for these general classes, it is usually advisable to indicate the particular category of pesticide.

3.4 toxicity: Toxicity is expressed by the LD 50 value; this a statistical estimate of the number of mg of the chemical per kg of body weight, required to kill 50 % of a population of test animals. The dose may be administered by a number of routes, usually orally or dermally, and the rat is the standard test animal. Oral or dermal LD50 values are used according to which route has the lower value for a specific chemical.

4 Requirements

4.1 Registration and competency of pest control operators

All contractors appointed to apply pesticides and herbicides must be registered in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947), as amended.

Eskom workers involved in the application of pesticides and herbicides must be trained in the safe handling of pesticides and herbicides and must work under the direct supervision of a trained supervisor who is registered in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act as a pest controller.

Initial training must be supplemented by regular further training and refresher courses.

4.2 Medical inspection: Pest control operators and other operational personnel using agricultural remedies must undergo regular medical examination, as prescribed by Eskom’s Medical Consultant. Periodic medical examinations are important to avoid chronic occupational intoxication. The examinations must include laboratory tests and patch tests if necessary.

In the case of overexposure to herbicides, the victim must be removed immediately from the scene and taken to fresh air, thoroughly washed and his clothing changed. Test facilities and qualified medical care must be provided. Treatment is symptomatic and must be carried out in hospital.

4.3 Selection of pesticides and herbicides

Purchasing of pesticides, herbicides and other agricultural remedies for use in Eskom, and the selection of such remedies for a particular application must only be done by competent persons specially designated for that purpose by the employer. Special emphasis must be placed on:

— only using registered agricultural remedies in accordance with labelled instructions;

— the use of the most cost-effective, safe, environmentally less damaging remedies;

— the correct use and handling of such products;

— the prevention of the exposure of persons, the public, animals, foodstuffs and adjacent land to such chemicals; and

— the prevention of the pollution of natural resources, ground and water by such remedies.

4.4 Record keeping of the availability, use and application of agricultural remedies

A register of all agricultural remedies in use, and in stock, must be kept and maintained on site, as well as the relevant material safety data sheets. The material safety data sheets must be readily available at strategic points, e.g., medical station, first aid points, stores, fire station, etc..

A record must be kept of the use of pesticides and herbicides. This includes what product, use by, when, for what purpose, amount used, particulars of personal protective equipment used and incidents of poisoning or spillage.

4.5 Condition and labelling of containers

Containers containing agricultural remedies are subject to climatic conditions and rough handling methods which may cause them to leak, break or render instructions illegible, causing potentially hazardous conditions. Supervisors, pest control operators and storekeepers must ensure that stocks are regularly inspected for leaks and damaged containers. All damaged or empty containers must be removed immediately and disposed of in a safe manner. No unlabelled containers must be allowed.

Labelling provides information on the hazardous nature of the pesticide as well as information regarding the identification and correct use of the pesticide in the container. Apart from the trade name, the ingredients list provides a breakdown of the substances contained in the chemical. This enables the user to identify the active ingredients and toxic substances.

The instructions on the label regarding use of the product are of major importance to the user. Many an accident or loss / damage incident has occurred due to neglect on the part of

the user, to either read instructions or apply a product as directed. The label also contains a hazard warning with signs and inscriptions related to pesticides or herbicides (see Normative references).

4.6 General principles

While the general principles for the use of pesticides remain the same for all compounds, the stringency with which they must be applied depends on the toxicity of the particular chemical. The following points must be taken into account:

4.6.1 The route of absorption

Poisons enter the body through the mouth (ingestion), the lungs (inhalation), the intact skin (percutaneous absorption) or wounds in the skin (inoculation). The inhalation hazard is determined by the physical form and solubility of the chemical. The possibility and degree of percutaneous absorption varies with the chemical, but some chemicals also exert a direct action on the skin, causing dermatitis. Pesticides are applied in many different forms: as solids, by spraying in dilute or concentrated form, as dusts (fine or granulated), and as fogs and gases. The method of application has a direct bearing on the likelihood of absorption.

Contamination through the skin is as lethal as ingestion or inhalation and utmost care must be taken to prevent unnecessary contact with the skin. For practical purposes, dermal or percutaneous absorption of a chemical is more important than oral absorption in occupational situations.

4.7 Safety and health measures

Adverse effects may be avoided by following the instructions provided on the labels of pesticides. The general toxicity, irritation and sensitization potentials and the mode of use determine the protection necessary in each case. Skin contamination is an ever present danger especially where heat and humidity preclude the use of protective clothing. Irritation of the skin and mucous membranes may result from spillings of various formulations. Extended contact is hazardous when the highest recommended application rates of working dilution are used in summer or in greenhouses. The following points are important:

4.7.1 Availability

The toxicity of many pesticides is such that their indiscriminate use by the general public is certain to result in many people being affected, often fatally. It is therefore essential that the public should have restricted access to all formulations.

4.7.2 Transportation

Pesticides of any degree of toxicity must be transported in containers which are clearly labelled, leak-proof and not easily damaged. They must not be transported beside or above any type of food, and all spillages must be immediately reported. Any foodstuff transported in the same compartment as a pesticide may be contaminated.

4.7.3 Labelling

The requirements regarding the labelling of pesticides are laid down in legislation and strictly applied to both imported and locally produced chemicals. Any pesticide must only be used in accordance with the instructions on the original label. (See guidelines for the RSA classification code of agricultural and stock remedies and associated labelling practices).

4.8 Training

All workers using pesticide formulations must be thoroughly trained. This training is particularly important if the pesticide is extremely toxic. Training programmes must cover all aspects of pesticide management.

4.9 Mixing

This is possibly the most hazardous phase of the use of pesticides, since the employee is exposed to the concentrate. In any particular situation, only selected personnel must be responsible for mixing. They must be thoroughly conversant with the hazards and provided with the proper facilities for dealing with accidental contamination.

4.10 Application

Protective equipment is always necessary. The choice of particular items of equipment will depend on the hazardous nature of the pesticide and the physical form in which it is being handled. Any consideration of protective equipment must include not only the provision, but also adequate cleansing, maintenance and replacement. Where climatic conditions preclude the use of some types of protective equipment, three other principles of protection can be applied, i.e. protection by distance, protection by time, protection by change of working method.

Protection by distance involves modifications of the equipment used for applications, so that the person is as far away as possible from the pesticide itself, bearing in mind the likely routes of absorption of a specific compound.

Protection by time involves limitation of hours of work. The suitability of this method depends on whether the pesticide is readily excreted or whether it is cumulative.

Protection by change of working method involves a reconsideration of the whole operation. Pesticides differ from other industrial processes in that they can be applied from the ground or the air. Changes of method on the ground depend largely on the choice of equipment and the physical nature of the pesticide to be applied.

Pesticides can also be applied from the air as liquids, dusts or granules. Liquids may be sprayed from very low altitudes, frequently as fine droplets of concentrated formulations. Drift is a problem particularly with liquids and dusts. Aerial application is an economical way of treating large tracts of land but entails special hazards to pilots and to workers on the ground.

Use up left-over spray mix, or tank rinsing fluid, by lightly spraying areas already sprayed. Do not empty tanks in one spot. Pesticides must not be transferred to other containers except for application purposes.

Return all empty pesticide containers to stores.

4.11 Public health measures

When pesticides are used, every effort must be made to avoid the contamination of water supplies. This not only concerns the actual application (when there may be immediate contamination) but must also include the consideration of remote contamination by run-off through rainfall on recently treated areas.

While pesticides in natural watercourses may be diluted to such a degree that the contaminated water may not be hazardous in itself, the effect on fish, water, plants used as food and grown in the watercourses, and on wild life as a whole as a result of bioaccumulation must not be overlooked.

4.12 Treatment of spillages

Spillages of pesticides at any stage of their storage or handling must be treated with great care. Contaminated top-soil must be removed to a registered disposal site.

4.13 Hygiene

Where a pesticide is of moderate or higher hazard and it can be readily absorbed through the skin, special precautions are necessary. In some situations, where workers may become accidentally contaminated with large quantities of concentrate, a shower or bath must be provided in addition to the usual washing facilities. Special arrangements for cleaning clothing and overalls are necessary. These must not be left for the worker to wash at home.

Since pesticides are often applied outdoors, depending on the chemical used, special care must be taken to provide washing facilities at the workplace, even though this may be in remote areas. Workers must be instructed to use these rather than wash themselves in canals and rivers, the water from which may be subsequently used for other purposes. The washing water provided must be disposed of with care. Smoking, eating and drinking before washing is prohibited when any pesticide is being handled or used.

4.14 Medical and first-aid facilities

Where an antidote exists, which can be readily used as a first-aid measure for a specific pesticide, it must be readily available to workers, who must be instructed in the method of its application. When any pesticide is being used on a substantial scale, doctors in the area must be informed by the persons responsible for distribution. The nature of the chemical used must be well defined so that the doctors can obtain specific antidotes where these are applicable and be on the lookout for cases of poisoning.

Strict routine medical supervision of workers exposed to concentrates of pesticides is essential and must include laboratory tests.

4.15 Requirements for a pesticide store

4.15.1 Location

When choosing a site for a new store, avoid close proximity to offices, housing, schools, hospitals, shopping areas, kitchens, manufacturing or storage premises or other populated

areas. Preference must be given to isolated locations. Avoid areas prone to flooding or areas used for water catchment. In the case of existing stores, an assessment must be made, based on compliance with the requirements of this standard whether continued use of the store can be justified. All new stores may only be constructed once an appropriate environment impact assessment has been undertaken.

4.15.2 Site access

The site must provide suitable access for the loading and unloading of delivery vehicles. Ideally the building should stand alone, with a space of at least 10 metres between it and surrounding property.

4.15.3 Drainage

The building must be on a site which minimizes the risk of contaminated water reaching water sources, ground water reserves or public drainage systems.

4.15.4 Buildings

Rooms used for storage must be soundly constructed and be equipped with automatic extraction fans and secure locks. Pesticides must be stored on shelves or pallets.

4.15.5 Lighting

Lighting levels must allow for the routine inspection of stored products and provide sufficient light for easy reading of product labels.

Artificial lighting must be installed above aisleways and at least 1 metre above the topmost stored product to prevent damage during mechanical handling operations.

4.15.6 Ventilation

The storeroom must be well ventilated. Natural ventilation must be provided by vents located in the upper and lower walls and in the roof. The lower vent must be above bund level. All vents must be designed or protected to prevent entry by any animal life. Ensure good air circulation in storerooms and ensure the installation of automatic extractor fans.

4.15.7 Security

The store must be secured to prevent unauthorized access.

4.15.8 Storage hazards

Knowledge of product hazards is an essential pre-requisite for the safe storing of all chemicals. During the storage of pesticides and herbicides, hazards are likely to be encountered with products which are flammable, toxic, corrosive, reactive or which may be oxidizing agents. Floors must be kept clear. Where repacking is done in storage rooms any spillages must be cleaned up carefully. All pesticides must be clearly identified.

Some compounds react with other chemicals or with air and this must be taken into account when planning storage facilities. Examples of this reaction are cyanide salts which react with acids to produce hydrogen cyanide gas and dichlorvos which vaporizes on contact with air.

4.15.9 Flammable

These are substances which can produce flammable vapour / air mixtures and which are therefore potential sources of fire or explosion.

4.15.10 Flammable liquids

Classification of flammable liquids is determined by their flash point. This is the lowest temperature at which the substance will form a flammable vapour / air mixture. Liquids with a flash point of 55 ℃ and below are considered fla mmable.

4.15.11 Flammable solids

These are readily ignitable solids or materials that cause fast propagation of a fire once ignited.

4.15.12 Toxic pesticides

These materials may be harmful or dangerous to man by way of ingestion, inhalation or skin absorption. Skin contact is the most common route by which poisoning can occur. Many chemicals can readily pass through intact skin into the body. Inhalation of dust and vapours can produce a particularly fast reaction due to the ease with which such contaminants can enter the bloodstream through the lungs. Ingestion is perhaps the least common cause of accidental poisoning and is probably caused by eating, drinking and smoking without having first washed the hands.

4.15.13 Corrosive

Such substances will attack skin or materials such as wood or metal, therefore leakage can corrode other packages and structures.

4.15.14 Oxidizing

Oxidizing agents will increase the rate at which a fire can develop. They may also react violently with other stored materials and can be the cause of spontaneous ignition.

4.15.15 Dangerous when wet

Within the range of common pesticides and herbicides, some dithiocarbamates are known to react adversely with moisture to produce carbon disulfide, a toxic and extremely flammable gas. Spontaneous ignition of this group of chemicals is also known to occur.

4.15.16 Hygiene, personal safety and housekeeping

Good standards of hygiene must be maintained and floors and shelves must be regularly and systematically cleaned, preferably using an industrial vacuum cleaner. Washing

facilities for employees must be provided and, where food and drinks are consumed on the premises, a separate room must be set aside for this purpose. Workers must be instructed to wash their hands before eating, drinking or smoking.

Annex A
(normative)
Checklist for the handling, storage, use and disposal of pesticides and herbicides

Question	Yes	No	Comments
Location and buildings			
Does the store satisfy the requirements relating to the location? If NO, in what respects does it fail?			

....			
Does the store satisfy the stipulations for site access?			
Does the store fulfil requirements regarding: construction materials; floor surface; internal fire break walls; roof covering and ventilation; head and smoke release; drainage; and local fire regulations? If NO, in what respects does it fail?			
Is the door sill or ramp at least 100 mm in height?			
What additional system for the containment of fire-fighting water exists? none; underground retention pit; external containment wall; and other? Describe:			
What is the overall capacity of containment?			
Is this sufficient to contain the expected volume of fire-fighting water?			
Is the store well ventilated?			
Are the pesticides in store appropriate for their intended use?			

Annex A
(continued)

Question	Yes	No	Comments
Are all vents above door sill or ramp height?			
Is there sufficient light? Is it properly positioned?			
Is the store fitted with a lightning conductor?			
Are sufficient emergency exits provided?			

Do these conform to OHSA requirements?			
If any office or amenity accommodation exists in the structure, is it adequately segregated from the store; has it an exit other than through the store?			
Store management			
Does the store have adequate precautions against arson and burglary?			
Do these precautions include: alarm systems; burglar-proof gates and windows; fenced-in premises; 24 hour guard service; and perimeter lighting?			
Are all staff adequately trained with respect to: knowledge of product hazards; safe operating procedures; and emergency procedures?			
Is a supervisor present during receipt and dispatch of all goods to check documents, package integrity, etc.?			
Are material safety data sheets available for all products?			
Is an outline of the storage plan of the materials in each store kept up to date?			
Is the store divided into distinctly separate storage bays?			
Are the racks used in the store non-combustible?			
Are stock records kept up to date?			
Does this guarantee knowledge of the quantity and location of the goods any time?			

Annex A
(continued)

Question	Yes	No	Comments
Hygiene and personal safety			
Are standards of hygiene and housekeeping adequate?			
Are personnel issued with protective clothing, protective gloves and respiratory protective equipment?			
Are these routinely worn when handling products?			

Does protective equipment exist on the premises for handling spills?			
Are adequate first aid materials and facilities provided and are staff familiar with their use?			
Spillages			
Is there a written authorized procedure for dealing with spillages?			
Are spilled dry products removed by vacuum cleaner?			
Is absorbent material available?			
Waste disposal			
Are wastes disposed of in a safe manner?			
Have the methods of disposal been approved by the authorities?			
Is the re-use of emptied containers satisfactorily controlled?			
Fire and environmental protection			
Is the non-smoking rule in the store strictly enforced?			
Are products stored at a safe distance from light fittings, electrical equipment and auxiliary equipment?			
Is the store included in the safety representative's checklist?			
Are records of accidental poisoning kept?			
Are all pest control operators and workers appropriately trained?			
Are records of medical examinations of workers available?			

Annex A
(concluded)

Question	Yes	No	Comments
Is disposal of empty containers, records, satisfactory?			
Availability of list of approved pesticides?			
Register of incident / work performed?			
Availability of material safety data sheets?			
Are pesticides handled and applied in a safe manner?			

Annex B
(normative)

Checklist for evaluation

1 Exceptional
2 Commendable
3 Acceptable
4 Unsatisfactory

Checklist	Score	Action
1 Checklist of relevant legislation?		
2 Personal protective equipment		
• provided?		
• used?		

• Used correctly?		
3 Training of pest control operators and workers?		
4 Medical examination?		
5 Inspection system for use and storage?		
6 Availability of job safety procedures?		
7 Safe disposal of empty containers?		
8 Availability of material safety data sheets?		
9 Personal hygiene of pesticide users?		
10 Availability of approved list of pesticides?		

NOTES

Annex C
(normative)

Policy guides

C1 Liability

During the chemical control of bush-invader plants or weeds, the SBU is responsible in the following three instances:

— legal obligation;

— Eskom policy and guides; and

— moral obligation towards land owners and the public.

C1.1 Legal obligation

The following acts directly or indirectly regulate the selling, safety and use of weed-killers:

— Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947).

— Foodstuffs, Cosmetics and Disinfectants Act (Act No. 54 of 1972).

— Hazardous Substances Act (Act No. 15 of 1973).

— Environment Conservation Act (Act No. 73 of 1989).

— Conservation of Agricultural Resources Act (Act No. 43 of 1983).

— Forest Act (Act No. 122 of 1984).

— Water Act (Act No. 54 of 1956).

— Mountain Catchment Areas Act (Act No. 63 of 1970).

— National Parks Act (Act No. 57 of 1976)/

— Sea Fisheries Act (Act No. 58 of 1973).

— OHSA Act (Act 85 of 1993).

— Provincial Ordinances.

Annex C
(concluded)

C.1.2 Eskom policies and guides

ESKADAAP2, *Occupation hygiene.*

ESKPBAAD6, *Environmental Management Policy.*

ESKPBAAD4, *Herbicide management.*

ESKPVAAD5, *Occupational hygiene risk assessment.*

Legal documents.

C.1.3 Moral obligation

Every Eskom employee has a moral obligation towards the environment, his fellow citizens and towards all future generations to protect and conserve his environment.

He is also morally obliged to protect his employer, Eskom, against negative publicity, and the danger and risk of financial losses.

C.2 Safety risk management

Eskom maintains a right-to-know policy. It is therefore every supervisor's responsibility to keep his sub-ordinates fully informed on the following:

— precautions to be taken when using dangerous substances; and

— the risk attached to the substances concerned and the handling of these substances.