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Edition 1

## **SOUTH AFRICAN NATIONAL STANDARD**

### **Development, maintenance and management of groundwater resources**

### **Part 9: The decommissioning of water boreholes**

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### Table of changes

Change No.	Date	Scope

### Foreword

This South African standard was approved by National Committee STANSA SC 5120.12B, *Water supply, equipment and systems – Groundwater extraction*, in accordance with procedures of Standards South Africa, in compliance with annex 3 of the WTO/TBT agreement.

SANS 10299 consists of the following parts, under the general title *Development, maintenance and management of groundwater resources*:

Part 0: *Glossary of terms.*

Part 1: *The location and siting of water boreholes.*

Part 2: *The design, construction and drilling of boreholes.*

Part 4: *Test-pumping of water boreholes.*

Part 5: *The design, selection and performance of pumping equipment for production boreholes.*

Part 6: *The installation and commissioning of pumping equipment for production boreholes.*

Part 7: *The rehabilitation of water boreholes.*

Part 8: *The management of water boreholes.*

Part 9: *The decommissioning of water boreholes.*

## **Development, maintenance and management of groundwater resources**

### **Part 9:**

#### **The decommissioning of water boreholes**

### **1 Scope**

This part of SANS 10299 specifies methods to be applied for the decommissioning of all types of water boreholes to protect groundwater resources.

### **2 Normative reference**

The following standard contain provisions which, through reference in this text, constitute provisions of this part of SANS 10299. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this part of SANS 10299 are encouraged to take steps to ensure the use of the most recent edition of the standard indicated below. Information on currently valid national and international standards can be obtained from Standards South Africa.

SANS 10299-0, *Development, maintenance and management of groundwater resources – Part 0: Glossary of terms.*

### **3 Definitions**

For the purpose of this part of SANS 10299 the definitions given in SANS 10299-0 apply.

## **4 Decommissioning of water boreholes**

### **4.1 General requirements**

Any water borehole, whether exploratory, for production, or observation, shall be properly decommissioned when it becomes no longer useful or productive.

Typical reasons for the decommissioning of a water borehole are:

- a) the production ceases or falls to an unacceptably low level and rehabilitation is not possible;
- b) the water quality deteriorates to a level where it is not suitable for its intended use;
- c) equipment is lost down the hole and cannot be recovered, making pump installation or use as an observation water borehole impossible;
- d) deemed not useful for monitoring of water level or water quality;

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- e) deemed necessary by a professional person or a competent person;
- f) when a water borehole intercepts a water strike of undesirable water quality and the threat of contamination of good quality water exists; and
- g) the water borehole becomes redundant.

### **4.2 Decommissioning requirements**

The nature of the aquifer and associated geological formations will determine the methods to be employed when decommissioning a water borehole. Decommissioning shall be done by a competent person or under the supervision of a professional person who shall ensure that the following conditions are met, as appropriate:

- a) the aquifer shall be protected from the ingress of surface water and pollutants via the water borehole;
- b) where more than one aquifer has been penetrated, the water borehole shall not serve as a conduit between aquifers, particularly where varying water qualities have been encountered;
- c) in the case of an artesian well the borehole section penetrating the confining layers shall be filled up with impermeable material so as to prevent movement of water out of the aquifer into the adjoining formations or to the surface (or both); and
- d) the water borehole shall be capped as a safety precaution, so as not to provide a trap for living creatures.

## **5 Decommissioning methods**

### **5.1 General**

One or more of the techniques in 5.2 and 5.3 shall be employed as deemed fit by the competent and professional persons.

### **5.2 Temporary decommissioning**

When the water borehole construction is such that it does not pose a threat to the aquifer, and the possibility of future use exists for the water borehole (for example, as an exploratory or observation hole) welded steel capping may be used. The method shall consist of welding a cover to the top of the protruding casing in such a manner that no surface water or pollution may enter the water borehole. The cap shall have a number welded onto it so that the water borehole can be identified.

### **5.3 Permanent decommissioning**

#### **5.3.1 Concrete capping**

When the water borehole construction is such that it does not pose a threat to the aquifer, and the possibility of a future use does not exist for the water borehole, the hole shall be capped with a concrete surface plug. This method shall consist of:

- a) removing surface material for a diameter of not less than 1 m and a depth of not less than 1 m to solid rock;
- b) removing or cutting the surface casing; and

- c) plugging the water borehole in accordance with 5.3.2 to 5.3.4 and filling the excavation with concrete to a minimum thickness of 0,5 m or the natural ground surface level.

### **5.3.2 Back filling**

When the water borehole requires back-filling, this shall be done with either the original drill cuttings or suitable material which will not pose a pollution threat to the aquifer. After back-filling, the water borehole shall be capped in accordance with 5.3.1.

### **5.3.3 Grouting**

Where a risk of pollution of the aquifer exist, either from the surface or from other formations, the water borehole shall be grouted to prevent such pollution from occurring. Grouting shall consist of introducing cement grout or bentonite grout or another type of suitable grout to the threatened water borehole sections by means of a tremie pipe or a similar means. The water borehole sections where no pollution threat exists may be backfilled and the water borehole capped in accordance with 5.3.1.

### **5.3.4 Bentonite**

Bentonite may be used below the static water level instead of cement grout in sensitive aquifers with a high risk of pollution from the surface, with a concrete plug at the top in accordance with 5.3.1.