

No. R. 447

27 May 2011

MINE HEALTH AND SAFETY ACT, 1996 (ACT NO 29 OF 1996)**REGULATIONS RELATING TO SURVEYING, MAPPING AND MINE PLANS**

I, **S SHABANGU**, Minister of Mineral Resources, under Section 98(1) of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) and after consultation with the Council, hereby amends Chapter 17 of the Regulations in terms of the Mine Health and Safety Act, as set out in the Schedule.



S SHABANGU

MINISTER OF MINERAL RESOURCES

SCHEDULE**REGULATION AMENDMENTS****CHAPTER 17****SURVEYING, MAPPING AND MINE PLANS****Amendment of Chapter 17 of the regulations**

The Mine Health and Safety Act is hereby amended by the substitution for Chapter 17 of the following chapter:

SCHEDULE**CHAPTER 17****17(1) DEFINITIONS**

In this Chapter, unless the context indicates otherwise-

"bedded mineral deposit" means any reef, coal seam, lode, mineral bed or fissure, which occurs conformably within its country rock and is not of a massive nature;

"chart datum" means the Lowest Astronomical Tide in all ports of the Republic of South Africa and Namibia as determined from time to time by the Hydrographer of the South African Navy;

"competent person" for purposes of regulation 17(2)(a) means:

(a) in the case of an underground mine or a surface mine where blasting takes place, a person in possession of a Mine Surveyor's Certificate of Competency issued by the Department; or

- (b) in the case of a surface mine where blasting does not take place, a person in possession of a Mine Surveyor's Certificate of Competency issued by the Department; or

a person who has passed the examination for mining legislation as is required for the Mine Surveyor's Certificate of Competency issued by the Department and who is in possession of either:-

- (i) an Advanced Certificate in Mine Surveying issued by the Chamber of Mines of South Africa and who has at least three (3) years practical experience in mine surveying; or
- (ii) a National Diploma in Mine Surveying issued by a tertiary institution accredited by the Department of Education, or
- (iii) a person who has been assessed competent against a qualification recognised by the Mining Qualification Authority for this purpose.

- (c) in the case of mining at sea, a person in possession of a Mine Surveyor's Certificate of Competency issued by the Department; or

a person who has passed the examination for mining legislation as required for the Mine Surveyor's Certificate of Competency issued by the Department and who is in the possession of either;

- (i) a qualification in Hydrographic Surveying recognised by the Council for Professional and Technical Surveyors of South Africa for registration in the category of Technician; or
- (ii) a person who has been assessed competent against a qualification recognised by the Mining Qualifications Authority for this purpose.

"Director: Mine Surveying" means the person appointed as such by the *Department* in terms of the *Public Service Act of 1994*;

"fixed position" means any point other than a **survey station** which is fixed within the relevant accuracy requirements for the class of survey concerned, and which is used for the purpose of locating details to be shown on **plans**,

"fluid material" means any substance, excluding gas, that has a potential to flow, including water, slimes and mud;

"hazardous service" means any object, structure or installation rendering a service with a potential risk to health or safety;

"plan(s)" means any plan, section or projection required to be prepared by these regulations;

"professional geotechnical specialist" means a person who is registered with –

- (a) the Engineering Council of South Africa as a Professional Civil Engineer and is registered in the sub category of Geotechnical Engineering; or
- (b) the South African Council for Natural Scientific Professions as a Professional Scientist in the field of engineering geology;

"reserve land" means any piece of land over which a servitude is registered or reserved for possible registration of a servitude in respect of roads, railways, power lines, pipe lines, conveyor lines, canals, etc.;

"restricted area" means any area where mining is restricted due to significant risk;

"risk assessment" means the hazard identification and risk assessment required in terms of section 11 of the Act;

"safety pillar" means every portion of a reef, mineral deposit or ground left *in situ* for the support and protection of the surface, objects thereon or underground workings;

"sea" means the sea as defined in the National Environmental Management: Integrated Coastal Management Act 2008 (Act 24 of 2008);

"survey point" means any easily identifiable point located by localized surveying, other than a **survey station**;

"survey station" means any point that has been surveyed within the prescribed standards of accuracy; and

"workings" means any excavation made or being made for the purpose of searching for or winning minerals or for any purpose connected therewith.

GENERAL REQUIREMENTS FOR MINING AT SEA AND ON LAND**APPOINTMENT OF COMPETENT PERSONS**

- 17(2)(a) The employer must appoint a **competent person** to be in charge of surveying, mapping and mine plans at the mine, and if the services of more than one **competent person** are engaged, ensure that their functions do not overlap. The Chief Inspector of Mines may require the appointment of more than one **competent person** where in his opinion such an appointment is necessary.
- (b) The employer must in writing inform the Chief Inspector of Mines of the appointment of any **competent person** in terms of regulation 17(2)(a), and of the termination of any such appointment, within 7 days of the date of such appointment or termination. In the case of an appointment, the notification must include-
- (i) the name of the **competent person**;
 - (ii) certified copies of all relevant qualifications of the **competent person**; and
 - (iii) whether the appointment of the **competent person** is full time or part time.
- (c) In the case of an underground mine, one **competent person** appointed under regulation 17(2)(a) must be able to reach the mine in the case of those emergencies and within such time(s), as determined in terms of the mine's risk assessment. Such emergencies and time(s) must be included in the mine's mandatory Code of Practice for Emergency Preparedness and Response.

Appointment at two or more mines

- (d) The **competent person** appointed at any mine by the employer under regulation 17(2)(a) may not in addition be appointed under regulation 17(2)(a) as a **competent person** at any other mine, except with the written permission of the Chief Inspector of Mines and subject to such terms and conditions as the Chief Inspector of Mines may determine.

Period permitted without a Competent Person

- (e) The employer must take reasonable measures to ensure that no mine is worked without a **competent person** appointed under regulation 17(2)(a) for more than 60 days in any period of 6 consecutive months. The employer must in writing appoint a suitably qualified person to perform the functions of the **competent person** under this Chapter during such period of 60 days or portion thereof, as the case may be.

DUTIES AND RESPONSIBILITIES

17(3)(a) The **competent person** appointed under regulation 17(2)(a), and the suitably qualified person appointed under regulation 17(2)(e) are not responsible for the accuracy of the surveying done before their appointments

(b) No person may withhold from the employer any survey records or **plans** prepared in terms of these regulations.

17(4) The employer must take reasonable measures to ensure, in all surveying and mapping done and all **plans** prepared for purposes of these regulations by the **competent person**, that:

Units of Measure

(a) all units of measure conform to the metric system, except angular measurements which must conform to the sexagesimal system;

Survey System

(b) all mine survey systems conform to the National Control Survey System as determined by the Chief Director: Surveys and Mapping as contemplated in the Land Survey Act, Act No 8 of 1997. The projection origin may be changed to reduce the numerical values of the co-ordinates. Survey systems established on a mine prior to 1 January 1999 may be retained provided that a tabulation of the co-ordinates of at least 3 (three) **survey stations**, in both the existing mine survey system and the National Control Survey System, are shown on every sheet comprising a **plan**;

Datum Plane (Mining on land)

(c) elevations determined above and below ground on mines established after 12 November 2004, refer to mean sea level, based on the South African Land Levelling Datum as determined by the Chief Director: Surveys and Mapping as contemplated in the Land Survey Act, Act No 8 of 1997.

Datum Plane (Mining at sea)

(d) bathymetric elevations determined at **sea** refer to **chart datum**;

Colours and Sign Conventions

(e) all **plans** conform to the conventional signs and colours provided by the **Director: Mine Surveying**;

Back up and storage of Data

- (f) if any **plans** required in terms of this Chapter are kept electronically, they are adequately backed up; and
- (g) all survey records are securely stored in a dry and fire proof place when not in use.

SAFETY PRECAUTIONS**Responsibilities regarding safety precautions**

- 17(5) The employer must take reasonable measures to ensure that the **competent person** referred to in regulation 17(2)(a) is at all times aware of-
- (a) **workings** which are being advanced;
 - (b) surface structures or objects which may be affected by mining;
 - (c) **workings** which are being abandoned or closed down, in order to allow the final surveying thereof;
 - (d) all **workings** or any place on surface where there is, or is likely to be, a dangerous accumulation of **fluid material**, noxious or flammable gas; and
 - (e) **safety pillars** that are being, or have been, removed.
- 17(6) The employer must take reasonable measures to ensure that the **competent person** referred to in regulation 17(2)(a) in writing notifies the employer, which notification must be dated, of any **workings** being advanced to come within:
- (a) a horizontal distance of 100 (one hundred) metres from **reserve land**, buildings, roads, railways, dams, waste dumps or any other structure whatsoever including structures beyond the mining boundaries, or from any surface, which it may be necessary to protect in order to prevent any significant risk.
 - (b) 50 (fifty) metres from any excavation, **workings**, **restricted area** or any other place where there is, or is likely to be a dangerous accumulation of **fluid material**, noxious or flammable gas. Such notification must include a sketch plan giving the distance to such place from the nearest **survey station**.

- 17(7) The employer must take reasonable measures to ensure that -
- (a) no mining operations are carried out within a horizontal distance of 100 (one hundred) metres from **reserve land**, buildings, roads, railways, dams, waste dumps, or any other structure whatsoever including such structures beyond the mining boundaries, or any surface, which it may be necessary to protect in order to prevent any significant risk, unless a lesser distance has been determined safe by **risk assessment** and all restrictions and conditions determined in terms of the **risk assessment** are complied with;
 - (b) **workings** coming within 50 (fifty) metres, from any other excavation, **workings, restricted area** or any other place where there is, or is likely to be a dangerous accumulation of **fluid material**, noxious or flammable gas are mined subject to such restrictions and stopped at such positions as determined by **risk assessment**.
 - (c) where ground movement, as a result of mining operations, poses significant risk, an effective ground movement monitoring system is in place.
 - (d) survey records and **plans** relating to conditions described in paragraphs (a) and (b) above, are made available to the persons doing the **risk assessment**.
- 17(8) No person may erect, establish or construct any buildings, roads, railways, dams, waste dumps, **reserve land**, excavations or any other structures whatsoever within a horizontal distance of 100 (one hundred) metres from **workings**, unless a lesser distance has been determined safe -
- (a) in the case of the employer, by **risk assessment** and all restrictions and conditions determined in terms of the **risk assessment** are complied with; or
 - (b) in the case of any other person, by a **professional geotechnical specialist** and all restrictions and conditions determined by him or her or by the Chief Inspector of Mines are complied with;
- 17(9) The person(s) responsible for activities in terms of regulations 17(7)(a) and 17(8) must-
- (a) in the case of an employer, provide the Chief Inspector of Mines with the distance and accompanying restrictions and conditions for comment, and;

(b) in the case of other persons, provide the Chief Inspector of Mines with the distance and accompanying restrictions and conditions for approval.

17(10) No mining operations, erecting, establishment, or construction, as contemplated in regulations 17(7)(a) and 17(8) respectively, may take place until such written comment or approval, as referred to in 17(9)(a) and 17(9)(b), has been obtained.

Boundary Pillars

17(11) The employer must take reasonable measures to ensure that on the inside of every mine boundary, continuous pillars are left standing (in situ) the width of which, measured horizontally and at right angles to the boundary line, must not be less than-

(a) for underground coal mines, 15 (fifteen) metres;

(b) for all other mines, 9 (nine) metres.

17(12) The employer must take reasonable measures to ensure that no boundary pillars are worked or cut through unless written permission has been obtained from all relevant adjacent employers and the Principal Inspector of Mines, provided that in the absence of any adjacent employer, permission need only be obtained from the Principal Inspector of Mines to work or cut through such boundary pillars.

Check Survey

17(13) Should the **Director: Mine Surveying** be of the view that there may be errors in any survey or **plans** constructed there from or where they do not conform to the standards of accuracy required by these regulations, he or she may cause a check survey to be carried out. The cost of such check survey must be borne by the employer if it is proved that there are errors in any survey or **plans** constructed there from, or that they do not conform to the standards of accuracy required by these regulations.

SURVEY PRACTICE ON LAND (SURFACE AND UNDERGROUND) AND AT SEA

17(14) The employer must take reasonable measures to ensure in all surveying and mapping done and all **plans** prepared for purposes of these regulations by the **competent person**, that:

Survey Stations

- (a) sufficient **survey stations** are established, so that all surface objects and all **workings** can be accurately surveyed. Each **survey station** must be clearly marked with a unique number and recorded in a register;

Standards of Accuracy: Surface and Underground

- (b) the minimum standard of accuracy and class of survey for the fixing of **survey stations** on both horizontal and vertical planes are in accordance with the following formula:

$$A = 0,015 + \frac{S}{30\,000}$$

where S is the distance in metres between the known and the unknown **survey station**; provided that in the case of a traverse, after a check survey has been completed, the error in direction of a line between any two consecutive **survey stations** must not exceed 2 (two) minutes of arc, provided that the horizontal and vertical displacement between the measured position and final position of a **survey station** does not exceed 0,1 (zero comma one) metres;

- (i) the allowable error for a Primary Survey (Class A) is not greater than A metres. Primary Survey means any survey carried out for the purpose of fixing shaft positions, shaft stations, underground connections, upgrading of secondary surveys to primary surveys and establishing primary surface survey control;
- (ii) the allowable error for a Secondary Survey (Class B) is not greater than 1,5A metres. Secondary Survey means any survey carried out for the purpose of fixing main or access development, mine boundaries and establishing secondary surface survey control;
- (iii) the allowable error for a Tertiary Survey (Class C) is not greater than 3A metres. Tertiary Survey includes **survey stations** established from secondary **survey stations** for localised survey purposes;
- (iv) the allowable error for a Localised Survey is not greater than 0,2 (zero comma two) metres in addition to the allowable error at the nearest **survey station**. Localised Survey means measurements taken from a survey network to locate surface or underground **workings**, structures and features. This includes normal tape triangulation for month-end measurements, plugging, offsetting and tachometric work;

Accurate Representation on Plan

- (v) errors in representation on **plan** do not exceed 0,1% (zero comma one per cent) of the denominator of the scale of the **plan**, in addition to the allowable survey error at the nearest **survey station** or **fixed position**. Where accurate surveying is not possible due to significant risks, the estimated position of affected **workings** or objects must be indicated on the **plan** by broken lines and with reasons why accurate measurements could not be made;

Standards of Accuracy at Sea

- (c) all **fixed positions** determined at sea for the purpose of locating detail to be shown on **plans**, comply with the standards as set out in column 1b of Table 1 in the Minimum Standards of the International Hydrography Organisation (IHO) Standards , 5th Edition, dated February 2008;

Details required on Plans

- (d) the following detail is depicted on all **plans** where applicable-
- (i) the name of the reef, lode or mineral bed;
 - (ii) planes of sections or planes of **plans**,
 - (iii) a subject heading indicating the name of the mine and the name of the **plan**,
 - (iv) the name and signature of the **competent person** for purposes of regulation 17(2)(a) against the relevant date of updating;
 - (v) the identification number allotted by authorities;
 - (vi) the survey system and co-ordinates of origin used;
 - (vii) a north point;
 - (viii) the scale of the **plan**,
 - (ix) a legend illustrating colours and conventional signs not provided for by the **Director: Mine Surveying**,
 - (x) co-ordinate lines sufficient in number for the scale of the **plan** to be verified;
 - (xi) in the case of mining at sea, also geographic co-ordinates of the centre point of the sheet (longitude and latitude);
 - (xii) in the case of mining at sea, also the relationship between the South African Land Levelling Datum and the latest **chart datum** determined;

Material and Size of the Plans

- (e) all **plans** are drawn on durable transparent draughting material on sheets of a size not greater than AO as defined by the International Organisation for Standardisation. The **Director: Mine Surveying** may request in the case of **plans** produced by means of computer aided draughting (CAD), that such **plans** be produced on suitable draughting material;

Scale of Plans - Land

- (f) all **plans** are drawn to a scale of 1:1 500 in the case of a coal mine, and 1:1000 in the case of any other mine, unless specifically provided otherwise in these regulations;

Scale of Plans - Sea

- (g) in the case of mining at **sea**, the general **plan** referred to in regulation 17(25) is drawn to a legible scale;

Plans to be Kept Up to Date

- (h) **plans** are at all times correct to within 12 (twelve) months, except for the **plans** showing the **workings** which must at all times be correct to within 3 (three) months. In the case of offshore prospecting and mining, **plans** must at all times be correct to within 6 (six) months;

Inventory of Plans

- (j) an inventory of all **plans** and all copies called for in terms of regulation 17(26) is kept, showing the following details -
- (A) the name of the mine;
 - (B) the name and number of the **plan**;
 - (C) the date of the last updating of the **plan** and the name of the **competent person** for purposes of regulation 17(2)(a);
 - (D) the relevant details where a **plan** has been superseded;
- and

Superseded Plans

- (k) when a **plan** or sheet is superseded by another **plan** or sheet, the old and the new **plan** are referenced accordingly.

RESPONSIBILITY FOR MINE PLANS

- 17(15) The employer must take reasonable measures to ensure that the **competent person** referred to in regulation 17(2)(a)-
- (a) constructs accurate **plans**, as contemplated in regulations 17(16) to 17(25), which are readily available to the employer. Such **plans** must cover all **restricted areas** and the areas where the surface infrastructure and **workings** occur; and
 - (b) determines the accuracy of any **plan** or drawing which was not prepared by him or her, where any inaccuracy on any such **plan** or drawing may create a risk of endangering the health or safety of any persons.

PLANS TO BE KEPT***Index Key Plan***

- 17(16) A legible index key **plan**, showing the areas covered by the relevant **plan** sheets, the mine boundaries and the farm names and boundaries within and adjacent to the mine, or this detail may be shown on every **plan** sheet as an inset key **plan** drawn to a legible scale.

Surface Plan

- 17(17) A **plan** of the surface showing the boundaries of the mining area, names of adjacent mining areas, the primary surface **survey stations**, outcrops and dips of the mineral deposits, perimeters of all surface mining, shafts, openings, rescue boreholes, subsidence or cavities, areas of restricted mining affecting the surface, any **hazardous services** whether on surface or buried and every surface object, structure or **reserve land** which requires protection against mining.

Surface Contour Plan

- 17(18) A surface contour **plan** showing relevant mine and farm boundaries, original surface contours, boreholes and watercourses.

Mine Ventilation and Rescue Plan

- 17(19) At every underground mine, a ventilation and rescue **plan** of the **workings**, taking into consideration the requirements of regulation 17(22), drawn to a legible scale and depicting the ventilation districts, the direction of air currents, the quantity of air circulating in such ventilation district, the position of each permanent fan, door, regulator, crossing, stopping, telephone, refuge bay, rope-aided or normal escape route, safe place, first aid room, main water valve, fire fighting equipment site, emergency power source and any area sealed off for fire or spontaneous combustion.
- (a) A square grid, lettered horizontally and numbered vertically, drawn to a suitable scale must be shown on the **plan** contemplated in regulation 17(19).
- (b) The information relating to the ventilation aspects of the **plan** in sub regulation (19) must be provided by the person authorised by the employer to do so and must be certified as accurate on the **plan** by that person.
- (c) An updated hard copy of the **plan** contemplated in regulation 17(19) must be immediately available at the mine for rescue operation purposes. In the case of a coal mine, an updated hard copy must be submitted to the Principal Inspector of Mines at intervals not exceeding 3 (three) months.

Mine Residue Deposit Plans

- 17(20) **Plans** (including sections) showing mine residue deposits containing **fluid material**.

Geological Plan

- 17(21) A **plan**, drawn to a legible scale, depicting geological features that could affect mining, or these features may be shown on the **plan(s)** referred to in regulation 17(22)

Plans of the Workings

- 17(22) **Plans** of the **workings** showing the following: boundaries of the mining area; names of adjacent mining areas; outlines and dips of the **workings**, date of measurement on the excavated side of the outline of the **workings**, heights representative of **workings**, **survey stations**; relevant **survey points**; areas in which mining has been restricted or prohibited; dams; explosives magazines; lines indicating the planes of sections; faults; dykes and any containment wall or any explosion proof seal, showing the designed static pressure in Kilo Pascal (kPa) of such walls and seals.

- (a) In the case of underground mines:
- (i) Where a **bedded mineral deposit** has an average inclination to the horizontal of more than 60° (sixty degrees), a **plan** showing the projection of the **workings** onto a vertical plane parallel to the average strike.
 - (ii) Where multiple **bedded mineral deposits** overlie each other, the **workings** thereof must be shown on separate **plans**.
 - (iii) Where a massive or irregular ore body is worked, level **plans** and vertical sections through the **workings** must be kept.
- (b) In the case of surface mines:
- (i) Where **bedded mineral deposits** are worked by surface mining methods, there must be shown on the surface **plan** sufficient data regarding the thickness and elevation of every mineral deposit worked in a suitable grid pattern. As an alternative to the grid pattern data, vertical sections may be kept, the lines of which must be indicated on the surface **plan**.
 - (ii) Where massive or irregular deposits are worked, level **plans** or vertical sections or a composite **plan** showing all the bench outlines, must be kept.

Level Plans

- 17(23) Level **plans** must show the outline of all **workings** at suitably chosen elevations. In the case of underground mines, the detail required in regulation 17(22) must be shown.

General Plan - Mining on Land

- 17(24) A general **plan**, showing the detail required in regulations 17(17), 17(18) and 17(22)(a) on one **plan** instead of on three separate **plans**, or a general surface **plan** showing the detail required in regulations 17(17) and 17(18) on one **plan** instead of two separate **plans**, may be constructed.

General Plan — Mining at Sea

- 17(25) A general **plan** showing the boundaries of the mining area, the names of adjacent mining areas, bathymetric contours, dates of mining and the locality of semi permanent production rigs and platforms.

Departmental copies of plans

- 17(26) The employer must provide the Principal Inspector of Mines annually with updated copies of the **plans**. In the case of computer aided draughting (CAD), legible **plans** in book form (approximately A3 size) or a copy of the index key **plan** referred to in regulation 17(16), indicating additionally the outlines of the **workings** as well as the surface infrastructure, and a copy of the back-up referred to in regulation 17(4)(f) must be provided.

Unsatisfactory Plans

- 17(27) Where in the opinion of the **Director: Mine Surveying plans** are deficient, he or she may have the mine surveyed and new **plans** prepared at the expense of the employer.

Plans Confidential

- 17(28) The Principal Inspector of Mines and the **Director: Mine Surveying** must keep information contained in any **plan** confidential and may only release such information in accordance with the Promotion of Access to Information Act (Act 2 of 2000).

MINE CLOSURE**Plans brought Up to Date**

- 17(29) The employer must take reasonable measures to ensure that, before a mine is abandoned, closed or rendered inaccessible, –
- (a) the **plans** and departmental copies thereof referred to in regulation 17(26) are brought up to date by the **competent person** referred to in regulation 17(2)(a) and that the **Director: Mine Surveying** is notified to inspect such **plans** and the copies thereof for approval; and
 - (b) where the surface has been disturbed by mining, a rehabilitation **plan** is drawn, to a legible scale, showing the final surface contours and established water courses and that the **Director: Mine Surveying** is notified to inspect such **plan** for approval.

Plans and Books to be handed in

- 17(30) The employer must take reasonable measures to ensure that updated hard copies of the **plans**, copies referred to in regulation 17(26) and inventories thereof on durable draughting material, together with the **survey station** register are handed in at the office of the **Director: Mine Surveying**, following the inspection and approval of the **plans** as contemplated in regulation 17(29).

Updating of Surface Plans

- 17(31) The employer must take reasonable measures to ensure, where rehabilitation is completed after cessation of mining, that the surface and rehabilitation **plans** contemplated in regulations 17(17) or (24) and (29)(b) are updated upon such completion.

Certificate of Compliance

- 17(32) The **Director: Mine Surveying** must issue a certificate of compliance with the requirements of regulations 17(29) to 17(31) to the employer within 60 (sixty) calendar days of compliance in respect of the said regulations.