

# Recognised Standard 10

Mine surveying and drafting

*Coal Mining Safety and Health Act 1999*

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## Mine surveying and drafting

This document is issued in accordance with Part 5 'Recognised standards' and section 37(3) of the *Coal Mining Safety and Health Act 1999*.

### Part 5 Recognised standards

#### 71 Purpose of recognised standards

71. A standard may be made for safety and health (a **recognised standard**) stating ways to achieve an acceptable level of risk to persons arising out of coal mining operations.

#### 72 Recognised standards

- 1) The Minister may make recognised standards.
- 2) The Minister must notify the making of a recognised standard by gazette notice.
- 3) The chief executive must keep a copy of each recognised standard and any document applied, adopted or incorporated by the recognised standard available for inspection, without charge, during normal business hours at each department office dealing with safety and health.
- 4) The chief executive, on payment by a person of a reasonable fee decided by the chief executive, must give a copy of a recognised standard to the person.

#### 73 Use of recognised standards in proceedings

A recognised standard is admissible in evidence in a proceeding if—

- a) the proceeding relates to a contravention of a safety and health obligation imposed on a person under part 3
- b) it is claimed that the person contravened the obligation by failing to achieve an acceptable level of risk
- c) the recognised standard is about achieving an acceptable level of risk.

### Part 3 – Safety and health obligations

#### 37. How obligation can be discharged if regulation or recognised standard made

- (3) ... if a recognised standard states a way or ways of achieving an acceptable level of risk, a person discharges the person's safety and health obligation in relation to the risk only by—
- (a) adopting and following a stated way
  - (b) adopting and following another way that achieves a level of risk that is equal to or better than the acceptable level.

Where a part of a recognised standard or other normative document referred to therein conflicts with the *Coal Mining Safety and Health Act 1999* or the Coal Mining Safety and Health Regulation 2001, the Act or Regulation takes precedence.

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This recognised standard is issued under the authority of the Minister for Employment, Skills and Mining [Gazetted]

Note: This document is controlled electronically. For the current copy see the Department of Employment, Economic Development and Innovation Website at [www.deedi.qld.gov.au/mines/recognised\\_standards.cfm](http://www.deedi.qld.gov.au/mines/recognised_standards.cfm) or contact the nearest Departmental office.

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# 1.0 Introduction

## 1.1 Purpose and scope

This standard provides a way for Mine Surveyors to comply with section 67 of *the Coal Mining Safety and Health Act 1999* and the relevant sections in the associated Regulations. It is to be followed by all Mine Surveyors, and is to be used for the control of surveying and mapping on a mine site.

## 1.2 Preparation

This standard provides for the measurement, recording, storage and preparation of all mine spatial information. It also provides for the digital recording, storage and preparation of the Mine Workings Plan in accordance with:

1. Section 67 of the *Coal Mining Safety and Health Act 1999*
2. Parts 8 and 9, and sections 126 and 282 of the *Coal Mining Safety and Health Regulation 2001*

## 1.3 Compilation

The Mine Workings Plan shall be referenced to the Map Grid of Australia 1994 (MGA94) based on the Geocentric Datum of Australia 1994 (GDA94) values. The relationship between the mine grid system and GDA94 shall be shown on the Mine Workings Plan. The coal mining Act and regulation require that a datum station is established near the mine for mine surveys and referenced to GDA94 and Australian Height Datum (AHD).

All mine plans used in the compilation of the Mine Workings Plan should be regarded with suspicion until their accuracy has been verified, and every effort should be made to obtain all existing information about the extents and location of old workings.

Where old workings exist that may constitute a danger, it shall be assumed, for the purpose of marking the Mine Workings Plan, that the workings contain water or fill, until the contrary is proven.

If it is not practical for a Mine Workings Plan to show accurately the details required under the Act, the Site Senior Executive (SSE) must ensure the parts of the plan containing the detail for which accuracy is not practical are clearly marked. In addition, the SSE must ensure information on the Mine Workings Plan is sufficiently accurate to achieve an acceptable level of risk for any operations at the mine.

## 1.4 Symbols

The technical symbols, sign conventions and definitions for strata to be shown on the Mine Workings Plan shall be in accordance with this document, and shall conform to those illustrated in Australian Standard AS 4368—1996 *Mine plans—Preparation and symbols*, Australian Standard AS 2916-2007 *Symbols for graphic representation of coal seams and associated strata*, and Geoscience Australia. If a symbol is not provided for in AS 4368, AS 2916 or Geoscience Australia, the Mine Surveyor may create a suitable symbol to be shown in the legend of the Mine Workings Plan.

## 1.5 Liability of a Mine Surveyor

The liability of the Mine Surveyor for the certification of accuracy of the Mine Workings Plan shall be limited to the period of the person's appointment as the Mining Surveyor for that mine.

## 2.0 Definitions

### **AHD**

Australian height datum (see height datum).

### **annotation**

An annotation is a note on the Mine Workings Plan that gives additional explanation of some feature or characteristic of the workings not otherwise evident from viewing the plan.

### **bench marks**

Benchmarks are marks established at or in a mine from which the levels of the mine workings are determined.

### **borehole**

A borehole includes any hole drilled for:

1. exploration (either vertically, horizontally or inclined)
2. gas drainage
3. auger holes
4. outburst relief
5. ventilation
6. services, such as power, water and other utilities.

### **Borehole Plan**

A plan prepared in addition to the Mine Workings Plan, where density of boreholes affect the clarity of the Mine Workings Plan.

### **certification**

A written statement signed by the Mine Surveyor attesting that the surveying procedures and plan preparation of the Mine Workings Plan for the period certified have been carried out according to the requirements of this standard. This certification shall be made in the mine record at least every 12 months. Such an entry in the mine record does not distract from the information being transferred digitally to the working plan if required for any reason.

### **Chief Inspector**

Chief Inspector refers to either the Chief Inspector of Coal Mines in the Department of Employment, Economic Development and Innovation (DEEDI).

### **CMSHA99**

Abbreviation for the *Coal Mining Safety and Health Act 1999*.

### **CMSHR01**

Abbreviation for the *Coal Mining Safety and Health Regulation 2001*.

### **Communication System Plan**

Plan showing the location of fixed communication devices for underground mines.

### **control surveys**

Substantially marked surveys developed from a mine baseline to define the direction and position of the workings of a mine.

## **discontinued**

Where an open-cut or underground mine or a seam/orebody has ceased being mined within the boundary of land comprising the mine for at least two months, it shall be deemed to be discontinued, even if the mine is on care and maintenance.

## **Electrical Installations Plan**

A plan showing the location of electrical reticulation lines and electrical installations at the mine.

## **Escapeways Plan and Refuge Location**

A plan for underground mines showing the exit routes to the surface from every part of the mine or to where emergency refuges or fresh air bases are located.

## **endorsement**

In accordance with section 58 of the CMSHR01 an endorsement shall be made on the Mine Workings Plan where the accuracy of any part of those workings cannot be verified.

## **Explosion Risk Zone Plan**

Plan prepared in accordance with section 291 of the CMSHR01 showing the location of explosion risk zones in the mine.

## **Fire-fighting and Rescue Plan**

Plan prepared in accordance with section 285 of the CMSHR01 showing fire-fighting pipe mains and appliances, and all items that might be relevant in the rescue of personnel or isolation or removal of areas of danger in an underground mine.

## **GDA94 and MGA 94**

The datum for surveys in Queensland is known as the Geocentric Datum of Australia 1994 (GDA94).

Grid coordinates are obtained using a transverse mercator projection known as the Map Grid of Australia 1994 (MGA94), which has the following specifications:

### **Designation of MGA94 Zones**

1. the central meridians and the designation of the several zones are as follows:

Central Meridian Longitude East of Greenwich	Designation of MGA94 Zone
141 °	54
147 °	55
153 °	56

2. The central meridian scale factor is 0.9996.
3. The zone width, 6° longitude plus ½ ° overlaps on each side.
4. The coordinates of a point on the earth's surface, to be used in expressing the position or location of each point in the appropriate zone, consists of two distances expressed in metres and decimals of a metre; the first expressed of these distances, the East, or E. coordinate gives the position in an east direction, the second expressed, the North, or N coordinate gives the position in a north direction.
5. The origin of coordinates of each zone is at the intersection of the central meridian of that zone with the equator, which origin is given the value of E 500,000 m; N 10,000,000 m.
6. The units used will be the international metre.
7. Coordinates stated for any point in the system shall be coordinate values determined in accordance with the principles of the projection of the Map Grid of Australia 1994 and shall depend on and conform to the coordinates of the State Survey Control marks.

## **height datum**

The height datum for each mine shall be directly related to the Australian Height Datum (AHD). The relationship between the mine level datum and AHD shall be noted on all Mine Workings Plans.

## **ICSM SP1**

The Inter-Governmental Committee on Survey and Mapping Special Publication 1 'Standards and Practices for Control Surveys'.

### **mine baseline**

A permanently marked survey line, established on the surface, from which surface and underground surveys are developed. The mine baseline may be computed from conventional or GPS observations

### **Mine Control Stations**

A Mine Control Station is a substantially monumented position, with historical and physical stability. There should always exist on a mine site a minimum of two Mine Control Stations that are recognised permanent survey marks (PSMs). These PSMs shall be established as part of the State Survey Control Network as described in the *Queensland Survey and Mapping Infrastructure Act 2003*. For an underground mine, the survey marks comprising the surface mine baseline shall be recognised PSMs.

### **Mine Surveyor**

A Mine Surveyor must be appointed at each mine site by the SSE. The Mine Surveyor's position description shall outline the assigned roles and responsibilities of the position including any legal obligations. The Mine Surveyor is the person responsible for surveying activities at the mine and for certifying the accuracy of the Mine Workings Plan.

The Mine Surveyor shall be a Registered Surveyor with the Surveyors Board of Queensland and hold the following mining endorsements:

1. For surface mines a Mining (O) or Mining (A) endorsement
2. For underground mines a Mining (A) endorsement.

**Note:** When a survey is carried out in accordance with this standard, the Mine Surveyor must exercise such immediate oversight and personal direction of the work as is necessary to ensure that they have the knowledge to certify all aspects of the survey and that the survey has been carried out in accordance with sound professional practice and this standard.

### **Mine Workings Plan**

A Mines Workings Plan is a plan that is required to be kept under section 67 of the CMSHA99.

The plan should show accurately the position of the mine workings and be compiled in accordance with this standard. It shall be submitted annually in digital format to the Chief Inspector.

### **orebody**

A mineralised mass, where the characteristics have been determined and deemed commercially viable. The term orebody is used once the economic limits of the mineralised mass and its grade level have been examined.

### **PSM**

Permanent survey mark

### **seam**

Any coal-bearing stratum or combination thereof mined as a discrete identity.

### **Statutory Inspection Districts Plan**

A plan prepared in accordance with section 313 of the CMSHR01 (Underground) showing the clearly marked boundaries of inspection districts in the mine.

### **Stonedust Sampling Zones Plan**

Plan prepared in accordance with section 303 of the CMSHR01 (Underground) showing the stonedust sampling zones, the incombustible material content results and explosion risk zone (ERZ) boundaries.

### **Surface Facilities Plan**

A plan prepared in accordance with section 284 of the CMSHR01 (Underground) showing the location of entries to mine workings, ventilation fan installations, access roads, administration buildings and other information which may assist in the case of an emergency.

### **Services Plan**

A plan prepared in accordance with section 127 of the CMSHR01 showing the location of both buried and surface services around the surface of the mine.

### **Subsidiary Survey or Working Survey**

A survey based on control surveys to develop the workings of a mine or to locate the position of the workings of a mine.

### **Surface Plan**

A plan prepared in accordance with section 283 of the CMSHA99 (Underground) to show the location of mine boundaries, bodies of water and possible inrush sources, surface contours, surface features likely to be affected by subsidence or, if disturbed by mining, cause danger to the mine.

### **survey records**

For the purpose of this standard, survey records shall be taken to mean field books, level books, coordinate books, computer data files, calculations and any other notebooks, sheets or plans used for recording or storing relevant survey data, all survey observations, compilations and other relevant survey data whether recorded or stored manually or electronically.

### **underground control network**

A series of interconnected stations appropriately identified and meeting ICSM SP1 Class C accuracy standards that form the basis for all other surveys.

### **ventilation plan**

Plan prepared in accordance with section 223(2) of the CMSHR01 (Underground) showing all ventilation appliances, airflow and gas monitoring sites.

## **3.0 Survey procedures**

### **3.1 Mine coordinate system**

All surface and underground surveys made and carried out in accordance with this standard shall have a known and documented relationship to the MGA94.

All mine surveys and plans shall originate from the Mine Control Network. The connection of the Mine Control Network to the state grid should be to Class B standards of accuracy as defined in ICSM SP1. Levelling on the minesite shall be propagated from a benchmark assigned AHD Reduced Level surveyed to Class LD spirit levelling (ICSM, SP1) or Class B from Trigonometric or GPS heighting.

## **3.2 Underground baseline**

If an underground baseline is used, it shall be in a suitable position and as long as practicable. The terminal marks shall be stable and durable. Baseline details shall be recorded on the Mine Workings Plan.

## **3.3 Traverses**

### **3.3.1 Accuracy**

Each underground control and subsidiary survey shall, where possible, be closed to the standard of accuracy as prescribed in ICSM, SP1 Class D. If closure is not practical, survey techniques recommended for achieving Class D or better should be employed.

### **3.3.2 Marking**

Each underground control station shall be adequately referenced and substantially marked. As far as practicable, the marks shall be placed in a position least likely to be disturbed.

## **3.4 Correlation of surface and underground surveys**

Correlation between surface and underground surveys shall be consistent with a Class D survey as prescribed in ICSM SP1.

In correlation of surface and underground surveys where methods other than direct traverse are employed for azimuth or coordinate transfer, the survey records shall disclose the special survey methods employed. Where vertical measurement is necessary for transference of the value of the surface benchmark to a nominated underground benchmark, the maximum permissible error should not exceed 0.05 metres.

## **3.5 Accuracy of levelling**

### **3.5.1 Order of accuracy of bench marks**

Such levelling shall be to ICSM, SP1 Class LD standard of accuracy. For open-cut mines only one benchmark to this accuracy is required.

### **3.5.2 Order of accuracy of workings**

Such levelling shall be to ICSM SP1 Class LE standard of accuracy or to within 0.1 metres.

## **3.6 Survey records and supply of survey information**

Systematic care should be taken for the safe and fireproof preservation of mine plans, notebooks, traverse records and associated calculations, correlation records and associated calculations, coordinate books or sheets and other records from which the workings have been plotted.

Survey records for each of the following purposes should be kept at the survey office for the mine:

1. surface and subsidence surveys
2. surface levelling
3. underground control surveys
4. underground subsidiary surveys
5. underground levelling
6. calculations
7. any other relevant information.

Such survey records shall be maintained manually on either a stable material or microform, or stored electronically or stored by other means not visually perceptible without the aid of a machine or device.

Where survey records are maintained in manual form the following requirements are to be observed:

1. All survey books shall be maintained in good order and shall have the following description attached:
  - a. titled with the mine name
  - b. seam name to which the book refers
  - c. consecutive index number.
2. The following procedures shall be adopted for entries into survey books:
  - a. all survey observations and measurements shall be recorded at the time of survey
  - b. in the event of alteration of a mistake there shall be no erasure. The erroneous entry should be struck through and the correction written above
  - c. the datum line of the survey and the azimuth adopted shall be clearly indicated
  - d. lengths shall be entered at the time they are measured. Where appropriate, corrections shall be noted and the lengths deduced there from shall be clearly indicated
  - e. bearing and distance from reference marks must be clearly shown
  - f. lines remeasured shall be so specified and original distances and bearings shown
  - g. The Mine Surveyor shall sign the field book that the work shown therein was performed by him or under his supervision and indicate the date on which the work was performed.

Where survey records are maintained in an electronic or other storage and retrieval device or system in a form not visually perceptible without the aid of a machine or device, a complete and separate duplicate of such records shall be preserved on paper or microfilm or on magnetic tape or disc or other permanent electronic medium.

The manager or the Mine Surveyor of any mine, upon the request of the Chief Inspector, shall make available on a stable material all or any survey records or certified copies thereof.

Upon abandonment of a mine, all survey records relevant to the preparation of the Mine Workings Plan shall be submitted to the Chief Inspector for retention unless otherwise directed in writing.

### **3.7 Requirements where workings are to become inaccessible**

Before any part of the workings of a mine become inaccessible, the position of all points of the workings shall be established from a subsidiary survey, where practical and safe to do so.

Sufficient levels shall be taken to enable contours of the floor of the working section to be shown on the Mine Workings Plan.

### **3.8 Surface movement and subsidence**

A survey into surface movement and subsidence shall be carried out in accordance with this standard. All subsidence data including field notes shall be kept at the mine in accordance with Clause 3.6.

## **4.0 Mine Workings Plan**

### **4.1 General**

#### **4.1.1 Authorisation**

The Mine Workings Plan is required to be kept at a mine and a copy supplied to the Chief Inspector annually under section 67 of the CSMHA99.

#### **4.1.2 Preparation**

The Mine Workings Plan shall be prepared by or under the supervision of the Mine Surveyor. The plan shall be prepared within three months of the opening of the mine or such other time as the Chief Inspector may direct by notice in writing served on the manager of the mine.

### **4.1.3 Composition**

The Mine Workings Plan for the purpose of this section is prepared from the digital form of the plan held in the computer. It is produced in a digital file and in hard copy form for presentation and archiving.

In the digital form the Mine Workings Plan shall be compiled as a number of themes/layers for the whole of the mine as described in Section 4.2.1, in a software program of the Mine Surveyor's choice and compatible with the Department of Employment, Economic Development and Innovation software.

The hard copy of the Mine Workings Plan shall consist of seam workings sheets for each seam being worked, prepared in the form of the Appendix of this standard.

## **4.2 Preparation by digital methods**

### **4.2.1 Themes/layers for underground mines**

For the preparation of the Mine Workings Plan for the seam being worked within the mapping area of the mine plan sheets, the following information shall be captured as a minimum of theme layers.

1. Mine boundary (land comprising the mine)
2. Mining lease boundaries.
3. First workings
4. Second workings
5. Highwall/auger mining
6. Survey stations with their identification and reduced level annotated.
7. The position of all known outcrops, faults, dykes, cinder belts, and other significant dislocations to the seam as surveyed.
8. Cadastre parcels
9. Contours of the floor of the working section at no greater than 5 metre intervals (shown in brown)
10. Any creek, river, watercourse, lake, sea, dam or other possible inrush source on the surface within the mine's boundaries or on land adjacent to the mine;
11. Boundaries of any road, railway, power line or other type of reserve or easement on the surface within the mine's boundaries;
12. Boreholes (only if not in separate and compatible database)
13. Locations of hazardous materials left in boreholes (only if not in separate and compatible database)
14. Mine shafts and drifts
15. Grid lines and values
16. All workings in the seam within 100 metres of the current workings including workings of adjacent mines.
17. For underground mines — an outline of all workings in any seam in any direction within 100 metres of the current seam being worked
18. Date lines (by dashed lines) indicating the extent of workings for each annual survey reporting period
19. Endorsements
20. Certification
21. Surface artificial structures

### **4.2.2 Themes/layers for open-cut mines**

For the preparation of the Mine Workings Plan for the seam being worked within the mapping area of the mine plan sheets, the following information shall be captured as a minimum of theme layers.

1. Mine boundary (land comprising the mine)
2. Mining lease boundaries
3. Highwall/auger mining
4. The position of all known outcrops, faults, dykes, cinder belts, and other significant dislocations to the seam as surveyed.
5. Cadastre parcels
6. Boundaries of any road, railway, power line or other type of reserve or easement on the surface within the mine's boundaries;
7. Contours of the floor of the workings at no greater than 5 metre intervals (shown in brown)
8. Boreholes (only if not in separate and compatible database)
9. Grid lines and values
10. Any creek, river, watercourse, lake, sea, dam or other possible inrush source on the surface within the mine's boundaries or on land adjacent to the mine
11. Extent of the excavations
12. All workings in the seam within 100 metres of the current workings including workings of adjacent mines
13. Date lines (by dashed lines) indicating the extent of workings for each annual survey reporting period
14. Surface artificial structures
15. Endorsements
16. Certifications

### **4.3 Hard copy of Mine Workings Plan**

A copy of the Mine Workings Plan, to be held at the mine, shall be prepared from the digitally held data and presented, in the form described in the Appendix of this standard, at the end of each 12 monthly period.

The Workings Plan seam sheets will be produced on paper. The previous copies may be archived or destroyed on preparation of the updated copy.

In the case of the cessation of duties of the Mine Surveyor, or the discontinuance/abandonment of a mine or a seam, the Workings Plan seam sheets will be produced on durable polyester film for certification and retention at the office for the mine except where the Chief Inspector otherwise determines.

### **4.4 Additional information**

Nothing in this standard shall prevent the Mine Surveyor from including any additional information on the Mine Workings Plan, providing it is shown in a manner consistent with this standard.

The Mine Surveyor shall show on the Mine Workings Plan any additional information as directed in writing by the Chief Inspector.

The Mine Surveyor shall ensure that any information that may create a danger either to the mine or to adjacent mines or to adjacent seams if worked, is recorded accurately on the plan.

### **4.5 Endorsement**

Where any information shown on the Mine Workings Plan is in doubt or any other information that the Mine Surveyor considers requires endorsement, the Mine Workings Plan shall be suitably endorsed.

## **4.6 Old workings/surveys**

Where possible and practical to do so, old workings/surveys should be changed the current mine datum, related to GDA 94 and suitably endorsed.

## **4.7 Certification**

The Mine Workings Plan sheets shall be certified by the Mine Surveyor by:

- signing and dating each working sheet (in the case of the hard copy)
- signing and dating a Compact Disk (CD) with a permanent marker (in the case where they are stored digitally).

By certifying each sheet of the hard copy or signing the CD of the Mine Workings Plan, the Mine Surveyor is declaring that, for that 12-month period:

1. The Mine Workings Plan has been prepared in accordance with this standard.
2. The surveys shown on the Mine Workings Plan have been completed to an accuracy as prescribed in this standard.

## **4.8 Certification history**

The Mine Workings Plan sheets, produced from the digital form, shall have recorded digitally in the Certification of Accuracy schedule the certification details for each year charted since the commencement of this standard.

## **4.9 Supply of Mine Workings Plan**

The Digital File and hard copy shall be submitted to the Chief Inspector by 31 December each year. In the case of a new mine the digital file and hard copy shall be supplied to the Chief Inspector three months after the commencement of mining operations.

On receipt of a digital file and hard copy from the mine, the Chief Inspector shall advise the SSE or the Mine Surveyor within 7 days of receipt that the digital file and hard copy have been received and that the digital file on the CD is able to be read.

The Chief Inspector, on receipt of the hard copy of the Mine Workings Plan shall archive the current copy. Redundant hard copies may be removed from the archive at the discretion of the Director-General.

## **4.10 Extension of time**

The Chief Inspector may, should the circumstances so warrant, grant an extension of time for the preparation and supply of the hard copy of the Mine Workings Plan or the supply of the digital file.

## 5.0 Closing plans

### 5.1 Authorisation

Statutory provisions pertaining to plans of abandoned mines appear in sections 67 and 280 of the CMSHA99.

### 5.2 Abandonment

Where a mine is abandoned the person who was the mine operator immediately before the abandonment must within 14 days after the abandonment send to the Chief Inspector the Mine Workings Plan or an accurate copy thereof, being a copy prepared by or under the supervision of the Mine Surveyor.

### 5.3 Charting for discontinuance or abandonment

Upon the discontinuance or abandonment of a mine or seam, the Mine Workings Plan shall be charted, dated and signed by the Mine Surveyor to the date of discontinuance or abandonment. The Mine Surveyor shall place a broken line around the extent of the workings at the time of discontinuance or abandonment, and shall date and initial this line.

The note 'Charted to date of discontinuance only or abandonment', as the case may be, is to be shown in the Certification of Accuracy schedule, above the date and the Mine Surveyor's signature.

Upon the completion of the required charting or preparation, the Chief Inspector is to be notified by the SSE that the plans are available for inspection.

Where the workings of a mine are deemed discontinued or abandoned, the following shall be supplied to the Chief Inspector:

- a digital record in a form suitable for archiving and future reference, and
- a plan, in the form of the Appendix to this standard, on durable, stable polyester matt material.

Upon abandonment of a mine, unless otherwise directed in writing by the Chief Inspector, all survey records are to be submitted to the Chief Inspector for retention. After the Chief Inspector is satisfied that the charting requirements have been met, the Mine Workings Plan is to be forwarded, by a date specified by the Chief Inspector, to the Chief Inspector for preservation.

### 5.4 Cessation of duties of the Mine Surveyor

Before permanent cessation of duties of the Mine Surveyor, the mine workings shall be surveyed in accordance with this standard up to the date of cessation of the Mine Surveyor. The Mine Surveyor shall show the date of the workings at the time of cessation on these plans in a similar manner to that of the annually submitted Mine Workings Plan.

The note 'Charted to date of Cessation of duties of the Mine Surveyor' is to be shown in the Certification of Accuracy schedule, above the date and the Mine Surveyor's signature.

The Mine Surveyor (by signing and dating the Certification of Accuracy schedule and by signing and dating the CD with a permanent pen) shall declare that, for the period from the last annual plan submission:

1. The Mine Workings Plan has been prepared in accordance with this Standard, and
2. The surveys shown on the Mine Workings Plan have been completed to an accuracy as prescribed in this standard.

On the cessation of duties at the mine, the Mine Surveyor shall produce (on a durable medium) a copy of the mine workings for retention at the mine's office. The outgoing Mine Surveyor should, where possible with the consent of the mine owner, take a copy of the sheets for his own record. The incoming Mine Surveyor should make a copy of the sheets for a record of commencement of work.

## **6.0 Other plans required**

### **6.1 Plan standards — general**

This section refers to all other plans required for compliance with the CMSHA99 and CMSHR01. A reference to plans in this section excludes the Mines Workings Plan which is covered elsewhere in this standard.

Plans subject to this standard required to be drafted by, or under the supervision of the Mine Surveyor for purposes of the mine should be:

1. prepared in accordance with the relevant Australian Standard — in particular, but not limited to, AS 4368, AS 2916 and the Australian Standard(s) for technical drawing.
2. drawn at a scale required by the relevant Section of the CMSHR01. Where scale is not mentioned the plan shall be of a suitable scale, but not less than 1 in 10000.
3. updated as required by the relevant section of the CMSHR01.
4. provided to all parties mentioned and displayed in all locations mentioned in the relevant section of the CMSHR01.

### **6.2 Certification of plans by an authorised mine official**

A plan referred to in section 6 of this standard shall have an appropriate area on the plan allocated for certification by the relevant mine official, authorised by the CMSHA99 and/or the CMSHR01, for information on that plan. Such certification shall indicate the origin of the information and that the information shown on the plan is truly represented.

### **6.3 Combining mine plans**

Nothing shall prevent the Mine Surveyor from combining one or more of the plans in this section, provided legibility of the combined plans is retained.

### **6.4 Surface mine plans**

#### **6.4.1 Highwall/auger mining excavations (shown on Mine Workings Plan)**

As required in section 62 of the CMSHR01. This is not a specific plan; however, the location and extent of Highwall/auger mining excavations shall be shown on the Mine Workings Plan.

#### **6.4.2 Mines Rescue Plan**

As required in section 63 of the CMSHR01

#### **6.4.3 Electrical Installations Plan**

As required in section 33 of the CMSHR01. This plan shall be certified by the Electrical Engineering Manager.

#### **6.4.4 Site Services Plan**

As required in section 127 of the CMSHR01.

### **6.5 Underground mine plans**

#### **6.5.1 Communication System Plan**

As required in Section 33 of the CMSHR01. This plan shall be certified by the Electrical Engineering Manager.

#### **6.5.2 Electrical Installation Plan**

As required in section 33 of the CMSHR01. This plan shall be certified by the Electrical Engineering Manager.

### **6.5.3 Escapeways Plan**

This plan shall show primary and secondary escape routes from every part of the mine to the surface, the location and contents of self rescuer caches, underground telephone stations, other communication devices, places of refuge, and ventilation control devices.

An up-to-date copy of the plan must be held in the following locations:

1. the surface notice board
2. self-rescuer caches
3. underground places of refuge
4. underground crib rooms
5. the mine's control room.

The Underground Mine Manager for the mine shall certify the Escapeways Plan for its correctness. This plan is to be updated monthly or as often as it becomes outdated.

### **6.5.4 ERZ Boundaries Plan**

As required in section 291 of the CMSHR01. The Underground Mine Manager for the mine shall certify the ERZ Boundaries Plan for its correctness.

### **6.5.5 Fire-fighting and Mine Rescue Plan**

As required in section 285 of the CMSHR01. In accordance with section 155 of the CMSHR01, the appointed Fire Officer for the mine is responsible for ensuring the currency of all fire fighting plans and procedures. The Fire Officer shall certify the Fire Fighting and Mines Rescue Plan for its correctness.

### **6.5.6 Highwall/auger mining excavations (shown on Mine Workings Plan)**

As required in section 62 of the CMSHR01.

### **6.5.7 Mines Rescue Plan/Surface Facilities Plan**

As required in sections 63 and 284 of the CMSHR01.

### **6.5.8 Statutory Inspection Districts Plan**

As required in Section 313 of the CMSHR01. The Underground Mine Manager for the mine shall certify the Inspection Districts Plan for its correctness.

### **6.5.9 Stonedust Sampling Zones Plan**

As required in section 303 of the CMSHR01.

### **6.5.10 Surface Land Plan**

As required in section 283 of the CMSHR01. The Mine Surveyor for the mine shall certify the Surface Land Plan for its correctness.

### **6.5.11 Site Services Plan**

As required in section 127 of the CMSHR01.

### **6.5.12 Ventilation Plan**

As required in section 127 and 285 of the CMSHR01. The appointed Ventilation Officer for the mine shall certify the Ventilation Plan for its correctness.

# Appendix

## Mine Workings Plan: information to be represented on hard copy

### A1 General

The mine shall be mapped on Seam Workings Sheets at a reduction ratio of 1:2500 sufficient to cover the extent of the mine workings.

The Seam Working Sheets shall have external dimensions of 841mm x 1189 mm. (A0 size International Standards Organisation)

The Seam Working Sheets shall have a mapping area 1000 mm x 800 mm with a grid 200 mm x 200 mm. This equates to a 2500 metres x 2000 metres drawing area, with a 500 metre grid when prepared at the reduction ratio of 1:2500.

Full lines are to be shown for the MGA at 500 metre intervals. The extremities of each grid line shall be annotated with the grid value. The grid of the plan shall be numbered in whole 500 metre intervals.

### A2 Underground mines

Each Seam Working Sheet shall show the following detail:

#### A2.1 In the heading:

1. the name of the mine (e.g Mine Workings Plan of Acme Mine)
2. the Parish and County names and the 1:100000 sheet map name(s)
3. and number(s)
4. the name of the seam being worked and the names of other seams known to have been worked in that sheet area
5. the number of the sheet and the number of sheets that make up the extent of Mine Workings, e.g. Sheet 1 of 6 sheets.

#### A2.2 In the map surround:

1. the reduction ratio and a graphical (bar) scale together with a statement that all measurements are in metres
2. a statement that the datum of the coordinates is the MGA94
3. a north point indicating grid north
4. a schedule of symbols used on the particular sheet
5. a sheet index showing:
  - (a) all the sheets necessary to cover the mine workings
  - (b) the number of each sheet
  - (c) an outline of the mining lease
  - (d) an outline of the mine workings
  - (e) the particular sheet shown by a heavy outline
6. a schedule of endorsements made by the Mine Surveyor
7. a schedule of Certificates of Accuracy of the sheet
8. the origin of levels and the grid bearing and terminal survey stations of the mine baseline

#### A2.3 In the mapping area

1. All detail shall be plotted at a reduction ratio of 1:2500.
2. The following detail will be shown:
  - (a) the workings of the mine in that seam
  - (b) panel names and sufficient cut through numbers to identify the numbering system

- (c) the position of all shafts, drifts, staple shafts and bins within that sheet.
- (d) the position of all boreholes within that sheet or
  - I. Where it is not practical to show all boreholes on the seam workings sheet, a separate borehole plan, which shall become part of the Mine Workings Plan, shall be produced as an overlay,
    - or
    - an electronic record (database) containing all necessary information and in the same grid reference system as the Working Plans to produce a borehole overlay plan.
  - II. A reference on the Seam Workings Sheet is required to indicate the existence of the borehole overlay sheet and/or electronic database.
  - III. All boreholes should be identified as to type and name and their current status (e.g. open, sealed, not intersecting seam).
  - IV. Where boreholes are drilled in adjacent strata sufficient reduced levels should be shown to indicate their position.
  - V. Any borehole which is removed by the mining process is not required to be shown. Remnant stubs of these holes however, which may present a hazard to future mining operations, must be shown.
  - VI. the nature, location and dimensions, as accurately as they are known, of any metallic, radioactive or other potentially harmful material left in any borehole intersecting or lying within a working seam.
- (e) the date and the initial of the Mine Surveyor shall be shown in the location corresponding to the position of the workings at the end of the survey reporting period in the format provided by AS4368
- (f) the position of survey stations or bench marks, their identification and reduced level
- (g) contour lines at an interval of 5 metres or less on the seam workings floor. (shown in brown)
- (h) the boundaries of any creek, river, watercourse, lake, sea, dam or other possible inrush source on the surface within the mine's boundaries or on land adjacent to the mine (shown in blue)
- (i) the boundaries of any road, railway, power line, reserve or easement on the surface that are within the mine's boundaries
- (j) outline of limit of highwall mining and augering. The maximum extent of this mining in the seam is to be shown and identified. Approximate levels into the extremity of highwall mining and augering are to be shown every 50 m.
- (k) the position and details of all known sills, faults, dykes, cinder belts and significant dislocations of the seam.
- (l) the surveyed location of all abandoned mining equipment, including, for example, mobile plant and conveyors
- (m) the surveyed location and other details of all known incidents of spontaneous combustion
- (n) the locations of areas of stimulation to the coal seam as defined in Section 61(4) of CMSHR01
- (o) the mine boundaries (land comprising the mine as per sections 49 and 50 of CMSHA99)
- (p) mining lease boundaries
- (q) Cadastral boundaries with annotated identification
- (r) parish and county boundaries with annotated identification.
- (s) the location of any artificial structures on the surface within the mine's boundaries
- (t) all workings in the seam within 100 metres of the current workings including workings of adjacent mines

- (u) an outline of all workings in any seam in any direction within 100 metres of the current seam being worked.

### **A3 Open-cut mines**

Each Seam Working Sheet shall show the following detail:

#### A3.1 In the heading:

1. the name of the mine (e.g Mine Workings Plan of Acme Mine).
2. the parish and county names and the National Mapping Sheet 1:100000 sheet name(s) and number(s).
3. the name of the seam being worked and the names of other seams known to have been worked in that sheet area.
4. the number of the sheet and the number of sheets that make up the mine (e.g. sheet 1 of 6 sheets).

#### A3.2 In the map surround:

1. the reduction ratio and a graphical (bar) scale together with a statement that all measurements are in metres,
2. a statement that the datum of the coordinates is either the MGA94 or the outlining the relationship between the datum of mine coordinate system and MGA94.
3. a north point indicating grid north
4. a schedule of symbols (refer to AS-4368, AS-2916 and Geoscience Australia) used on the particular sheet
5. a sheet index showing:
  - (a) all the sheets necessary to cover the open cut mine
  - (b) the number of each sheet
  - (c) an outline of the mine facilities and operations
  - (d) the particular sheet shown by a heavy outline,
6. a schedule of endorsements made by the Mine Surveyor
7. a schedule of certifications of the accuracy of the sheet
8. the origin of levels and the grid bearing

#### A3.3 In the mapping area:

1. All detail shall be plotted at a reduction ratio of 1:2500.
2. The following detail will be shown :
  - (a) the workings of the mine in that seam
  - (b) contour lines at an interval of 5 metres or less on the seam workings floor. (shown in brown)
  - (c) outline of limit of highwall mining and augering
  - (d) outline of the excavated pits
  - (e) the boundaries of any creek, river, watercourse, lake, sea, dam or other possible inrush source on the surface within the mine's boundaries or on land adjacent to the mine (shown in blue)
  - (f) the location of any artificial structures on the surface within the mine's boundaries
  - (g) the boundaries of any road, railway, power line or other type of reserve or easement on the surface within the mine's boundaries
  - (h) the position and details of all known outcrops, faults, dykes, cinder belts and significant dislocations of the seam
  - (i) the position of all boreholes within that sheet *or* where it is not practical to show all boreholes on the seam workings sheet then:

- I. A separate borehole plan, which shall become part of the Mine Workings Plan, shall be produced as an overlay.  
or  
An electronic record (database) shall be kept, containing all necessary information and in the same grid reference system as the Working Plans to produce a borehole overlay plan.
  - II. A reference on the seam workings sheet is required to indicate the existence of the borehole overlay sheet and/or electronic database.
  - III. All boreholes should be identified as to type and name and their current status (e.g. open, sealed, whether they intersect the seam).
  - IV. Where boreholes are drilled in adjacent strata sufficient reduced levels should be shown to indicate their position.
  - V. Any borehole which is removed by the mining process is not required to be shown. Remnant stubs of these holes, however, which may present a hazard to future mining operations, must be shown.
- (j) cadastral boundaries with annotated identification
  - (k) parish and county boundaries with annotated identification.
  - (l) mining lease boundaries
  - (m) the date and the initial of the Mine Surveyor shall be shown in the location corresponding to the position of the workings at the end of the survey reporting period in the format provided by AS4368.

## References

- Australian Standard AS 4368–1996 *Mine plans — Preparation and symbols*
- Australian Standard AS 2916–2007 *Symbols for graphic representation of coal seams and associated strata*
- Geoscience Australia [www.ga.gov.au/](http://www.ga.gov.au/)
- *Coal Mining Safety and Health Act 1999*  
[www.legislation.qld.gov.au/LEGISLTN/CURRENT/C/CoalMinSHA99.pdf](http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/C/CoalMinSHA99.pdf)
- *Coal Mining Safety and Health Regulation 2001*  
[www.legislation.qld.gov.au/LEGISLTN/CURRENT/C/CoalMinSHR01.pdf](http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/C/CoalMinSHR01.pdf)