

## Minerals And Mining (Health, Safety and Technical) Regulations, 2012 (L.I. 2182)

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IN exercise of the power conferred on the Minister responsible for Lands and Natural Resources by section 110 of the Minerals and Mining Act, (Act 703), 2006, these Regulations are made this 19th day of June, 2012.

### General administration

#### **Regulation 1—Powers and functions of the Inspectorate Division**

The Inspectorate Division shall

- (a) exercise the powers and perform the functions specified under these Regulations; and
- (b) subject to the supervision of the Minerals Commission, ensure the proper and effective implementation of the provisions of these Regulations.

#### **Regulation 2—Powers of inspectors**

(1) An inspector or another person appointed for that purpose under these Regulations by the Chief Inspector of mines, may, at a reasonable time in the day or in the night and on the production of the appropriate authorisation,

(a) enter, inspect, and examine a mine in a manner that does not unnecessarily impede or obstruct the working of the mine;

(b) examine and inquire into

(i) the state and condition of a mine or part of the mine and of matters and things that pertain to the mine in so far as they relate to the safety or health of persons employed in the mine, and

(ii) matters relating to these Regulations, to minimise any damage that may be caused to the environment by mining and mining related operations; and

(c) enforce compliance with these Regulations.

(2) For the purpose of an examination, inspection, or enquiry, an inspector may invite the manager of a mine or an official of the mine not below the rank of a mine captain or its equivalent, together with any other official or employee that the inspector considers necessary to accompany the inspector and that manager, official or employee shall comply with the request.

(3) An inspector may

(a) take samples of minerals and other substances from a mine

(i) for the purpose of analysis or testing; or

(ii) for use in evidence in connection with an offence against these Regulations, and

(b) for the purpose of inspection,

(i) take extracts from or make copies of a document, or

(ii) take photos of a mine.

(4) An inspector shall give a receipt for any object or document removed or taken in the course of the performance of the inspector's functions.

(5) An inspector may, by written notice as set out in Form One of the First Schedule to a holder of a mining lease or the manager of a mine, order

(a) the cessation of operations in, and the withdrawal of any or all persons from the mine or part of the mine where the Inspector considers that necessary in the interest of safety, health or the environment; or

(b) the discontinuance of the use of a machinery that the inspector considers unsafe, until the action necessary for safety as specified in the notice is taken and completed.

(6) Where the inspector is of the opinion that a circumstance, practice or omission in a mine or part of the mine is so defective or dangerous as to be likely to cause bodily injury or cause damage to any property and there is no provision in these Regulations concerning that situation, the Inspector shall

(a) make an order, as set in Form Two of the First Schedule, which directs the holder or the manager of the mine to remedy the situation immediately or within the time specified by the Inspector, and

(b) confirm the order by notice in writing, specifying the matters considered defective or dangerous and which the holder or manager is required to remedy immediately or within the time specified in the order.

(7) A holder or a manager who does not comply with an order made under sub-regulation (5) commits an offence and is liable on summary conviction to a fine of not more than fifteen thousand penalty units or a term of imprisonment of not more than twenty-five years or to both.

(8) A holder or manager may appeal under regulation 4 against an order made by an Inspector under this regulation.

(9) A copy of an order made under this regulation shall be kept as part of the record required to be maintained under regulation 43.

(10) An inspector may

(a) obtain and record statements from witnesses, or conduct enquiries regarding mine accidents, dangerous occurrences and contraventions of these Regulations,

(b) appear at inquests and call and examine witnesses and cross examine witnesses, and

(c) subject to authorisation by the Attorney General, conduct a prosecution for an offence under these Regulations.

(11) An inspector may

(a) exercise any power that is necessary for giving effect to these Regulations; and

(b) impose the penalties specified in the Second Schedule or other penalties resulting from an offence under these Regulations.

(12) An inspector in exercising the powers under these Regulations may be assisted by a person who the inspector believes has special or expert knowledge of the matter being inspected, tested or examined

### **Regulation 3—Powers of Chief Inspector of Mines to prepare guidelines**

The Chief Inspector of Mines may prepare guidelines on any matter that concerns the proper implementation of these Regulations.

### **Regulation 4—Appeals against instructions of Inspectors or Chief Inspectors of Mines**

(1) A holder or a manager of a mine may, within fourteen days after being informed of a decision or order, appeal in writing as set out in Form Three of the First Schedule to the Chief Inspector of Mines against the decision or order given by the Chief Inspector or any other person appointed by the Chief Inspector to perform the functions specified in regulation 2.

(2) The Chief Inspector of Mines may, on an appeal,

(a) rescind, affirm or vary the decision or order appealed against, or

(b) make a new decision or order, or

(c) refer the appeal to a committee of three recognised Managers chosen by the Chief Inspector of Mines and the decision of the committee shall be final as to the facts.



(3) The holder or manager of a mine which is subject to these Regulations may, within fourteen days after being given notice of the decision of the Chief Inspector, apply to the Commission for a review of the decision.

#### **Regulation 5—Fees**

Where any fees are prescribed to be charged in these Regulations, they shall be as specified in the Second Schedule.

#### Operating Plan and Operating permit

#### **Regulation 6—Exploration Operating Plan and Exploration Operating Permit**

(1) A holder of a reconnaissance licence or a prospecting licence shall not commence exploration operations unless an Exploration Operating Permit is issued by the Inspectorate Division in respect of the operations, as set out in Form Four of the First Schedule.

(2) An application for an Exploration Operating Permit shall be as set out in Form Five of the First Schedule.

(3) Subject to sub-regulation (1), a person shall not commence exploration operations, if that person has not

(a) submitted an Exploration Operating Plan to the Inspectorate Division; and

(b) received approval of the Exploration Operating Plan of that person from the Inspectorate Division.

(4) An Exploration Operating Plan shall be updated before the beginning of each year.

#### **Regulation 7—Content of Exploration Operating Plan**

(1) An application for an Exploration Operating Permit shall be accompanied with three copies of the Exploration Operating Plan.

(2) The Inspectorate Division may request for additional copies of the Exploration Operating Plan and the applicant shall submit the additional copies.

(3) The Exploration Operating Plan shall contain, at a minimum,

(a) the names, addresses and telephone numbers of the individuals responsible for the operation of the Exploration Operating Plan;

(b) the name and location of the concession, the serial number of the licence and the names and addresses of the surface and mineral owners on record;

(c) a detailed description of planned activities;

(d) a detailed time schedule;

(e) the equipment to be used;

- (f) a detailed reclamation plan; and
- (g) a detailed budget of planned operations.

(4) The Chief Inspector may prepare guidelines for the preparation of the Exploration Operating Plan.

### **Regulation 8—Mining Operating Plan and Operating Permit**

(1) A person who is granted a mining lease shall, before the commencement of operation of the mine, apply to the Inspectorate Division for a Mining Operating Permit as set out in Form Six of the First Schedule.

(2) A temporary Mining Operating Permit may be issued by the Chief Inspector of Mines as set out in Form Six A, for a period of six months to enable the holder of that permit to submit a detailed Main Mining Operating Plan covering activities over the lifetime of the mining operations, for approval and the issue of a final operating permit.

(3) Subject to sub-regulations (1) and (2), a person shall not commence operation of a mine, if that person has not

(a) submitted a Main Mining Operating Plan to the Inspectorate Division; and

(b) received approval of the Main operating plan of that person from the Inspectorate Division.

(4) A mine support service company may be issued with a Mine Support Services Operating Permit as set out in Form Six B of the First Schedule for prescribed services to a mine.

(5) Subject to sub-regulation (4) a person shall not render mine support services to the mine where that person has not submitted to the Inspectorate Division and received approval of that person's mine support services operating plan.

(6) The holder of a mining lease, or a manager of a mine shall submit to the Inspectorate Division for approval, an update of the Main Mining Operating Plan called a Yearly Mining Operating Plan that

(i) shows in detail the proposed works for the coming year; and

(ii) gives an updated outlook regarding the medium and long term development of the mining project.

(7) An application for a Mining Operating Permit shall be made as set out in Form Seven of the First Schedule.

### **Regulation 9—Content of Mining Operating Plan**

(1) An application for a Mining Operating Permit shall be accompanied with three copies of the Mining Operating Plan.

(2) The Inspectorate Division may request for additional copies of the Mining Operating Plan and the applicant shall submit the additional copies.

(3) The Mining Operating Plan shall contain at a minimum

(a) the names, addresses and telephone numbers of the individuals responsible for the operation of the plan and to whom notices and orders are to be delivered;

(b) the name and location of the concession, the licence or licence serial number and the names and addresses of the surface and mineral owners on record;

(c) a detailed description of geological conditions and mineral reserves and resources, with appropriate maps which indicate deposits, whether commercial or otherwise within the area where the mining is to be conducted;

(d) a copy of a suitable map or aerial photograph showing the topography, the area covered by the lease, the name and location of major topographic and cultural features and the plan for the drainage away from the affected area;

(e) the proposed methods of operating, which includes a description of the surface or underground mining methods, the proposed roads, the size and location of structures and facilities to be built, mining sequence, production rate, estimated recovery factors and stripping ratios;

(g) a detailed description of the

(i) mining methods;

(ii) processing procedures;

(iii) manner of handling of reagents, chemicals and fuel; explosives, in accordance with the Minerals and Mining (Explosives) Regulations (L.I. 2177)

(iv) manner of dealing with waste rock and disposal of tailings.

(v) processes of waste management; and

(vi) mine infrastructure.

(g) an estimate of the quantity and quality of the mineral resources, proposed cut off grade and if applicable, proposed blending procedures for the concession covered by the mining plan;

(h) an explanation of how ultimate maximum recovery of the mineral resource will be achieved and an appropriate justification for approval where a mineral deposit or a portion of a mineral deposit is not going to be mined or is going to be rendered incapable of mining by the operation;

(i) appropriate maps and cross sections which show the

(i) concession boundaries and the licence serial numbers;

(ii) surface ownership and the boundaries of the owners;

(iii) locations of existing and abandoned mines;

(iv) typical structure cross sections;

(v) location of shafts or mining entries, open cast mines, waste dumps, tailings storage facilities, water dams, preparation and processing plants, workshops and other surface facilities; and

(vi) typical mining sequence, with appropriate time frames;

(j) a narrative which addresses the environmental aspects associated with the proposed mine and which includes, at a minimum

- (i) an estimate of the quantity of water to be used and pollutants that may enter receiving waters;
  - (ii) a detailed design for the impoundment, treatment or control of runoff water and drainage from workings to reduce soil erosion and sedimentation and to prevent the pollution of receiving waters;
  - (iii) a description of measures to be taken to prevent or control fire, soil erosion, subsidence, pollution of surface and ground water, pollution of air, damage to fish or wildlife or other natural resources and hazards to public health and safety; and
  - (k) a reclamation schedule and the measures to be taken for surface reclamation of the concession that will ensure compliance with the established requirements and in instances in which the concession requires replanting of the vegetation of an area affected by operations, the
    - (i) proposed methods of preparation and fertilizing the soil prior to replanting;
    - (ii) types and mixtures of shrubs, trees or tree seedlings, grasses or legumes to be planted; and
    - (iii) types and methods of planting, which includes the amount of grass or legumes per hectare, or the number and spacing of trees or tree seedlings, or combinations of grass and trees;
  - (l) the methods of abandonment of operations proposed to protect the recoverable reserve and other resources that have not been mined which includes the method proposed to fill in, fence or close surface openings which are a hazard to people or animals; and
  - (m) any additional information that is necessary for approval of the Plan.
- (4) The Chief Inspector may prepare guidelines for the preparation of operating plans.

#### **Regulation 10—Modification of operating plans**

- (1) An Exploration or Mining Operating Plan may, with the approval of the Chief Inspector of Mines, be modified at any time to reflect a change in conditions or to correct a mistake.
- (2) The approval may be granted if an application is
- (a) submitted to the Chief Inspector of Mines; and
  - (b) accompanied with a written statement of
    - (i) the proposed modification; and
    - (ii) justification for the modification.
- (3) Approval for a proposed modification of an Exploration or Mining Operating plan shall only be granted if the Plan has previously been approved by the Chief Inspector of Mines.
- (4) The Chief Inspector of Mines may, where necessary, require a modification to the approved Exploration or Mining Operating Plan.

#### **Regulation 11—Emergency Response Plan**

- (1) The owner or manager of a mine shall submit to the Inspectorate Division for approval, an Emergency Response Plan capable of being implemented at any time in response to an emergency that occurs in the mine.

(2) The Emergency Response Plan shall

(a) contain a description and assessment of emergency scenarios and risks;

(b) provide for the establishment of an emergency co-ordination centre;

(c) provide for emergency

(i) notification procedures and communication system;

(ii) equipment and resources; and

(iii) scenarios and response procedures; and

(d) provide for

(i) clean-up, remediation, procedure for returning to normal operation;

(ii) training of staff; and

(iii) periodic emergency and evacuation drills of staff.

(3) The Inspectorate Division may request for additional copies of the Emergency Response Plan and the applicant shall submit the additional copies to the Inspectorate Division;

(4) The Chief Inspector of Mines may prepare guidelines which set out minimum standards for the preparation of Emergency Response Plans.

#### Inspections, investigations and enquiries

##### **Regulation 12—Type of inspections and investigations**

The Chief Inspector of Mines or an officer authorised by the Chief Inspector may conduct

(a) in relation to industrial minerals, a pre-licensing inspection;

(b) regular inspections to enforce compliance with standards, orders or decisions issued, or other requirements;

(c) compliance follow-up inspections to determine the status of notices and orders issued during a previous inspection;

(d) environmental inspections to control the performance of a mine in relation to environmental standards and its monitoring activities;

(e) special inspections after receipt of complaints or on request by other authorities, and for other reasons; and

(f) an inspection in relation to an accident or an incident.

##### **Regulation 13—Notice of result of inspection**

(1) An inspector after inspecting a mine shall

(a) enter in a record book as set out in Form Eight of the First Schedule approved for the purpose by the Inspectorate Division and kept at the mine or in the case of exploration operations, another place that is prescribed, a record of

(i) the parts of the mine inspected by that inspector; and

(ii) the nature of the inspection; and

(iii) each defect which the inspector observed as to the state and condition of the mine; and

(b) give notice in writing to the manager of

(i) the findings of the inspection,

(ii) any action the inspector has taken, and

(iii) any further action that the inspector requires to be taken in relation to the mine as a result of the inspection.

(2) The record book referred to in sub-regulation (1) shall be kept by the manager of the mine.

#### **Regulation 14—Specialist authorised by Chief Inspector of Mines**

(1) The Chief Inspector may authorise a person who has special or expert knowledge in relation to a matter which is the subject of an inspection to enter and inspect a mine and report the findings or recommendations of the inspection to the Chief Inspector.

(2) A person authorised under sub-regulation (1) shall produce at the time of entry a signed copy of the authorisation as set out in Form Nine of the First Schedule, to the holder or manager, or the person who is in charge of the operations in the mine.

#### **Regulation 15—Obstruction of inspectors**

(1) A person who

(a) wilfully obstructs or hinders, or

(b) fails to obey an order lawfully made in the course of duty by an inspector or a person authorised under regulation 14 is liable in the first instance to pay to the Commission, a penalty of not more than ten thousand United States dollars and for any subsequent offence, to a further penalty of five thousand United State dollars,

(2) A holder or manager of a mine, who when required by an inspector or by a person authorised under regulation 14 to provide the means or facilities necessary to enable the inspector to enter, inspect or examine, or exercise the powers of inquiry in connection with, any part of the mine neglects or refuses to provide the means or facilities commits an offence and is liable to the same penalty provided in sub-regulation (1).

#### **Regulation 16—Power of inspector to hold inquiries**

(1) Where an inspector has reason to believe that

- (a) during an exploration or mining activity a specific minimum standard is not being observed,
- (b) a dangerous occurrence as specified under regulation 27 has occurred, which may not have caused any personal injury or loss of life, or
- (c) loss of life or serious bodily injury has resulted from any accident associated with operations in or in relation to a mine or prospecting operation,

the inspector may hold inquiries into the failure to observe the minimum standards or into the accident or occurrence.

(2) For the purpose of an inquiry under sub-regulation (1), the inspector may as soon as possible

(a) summon a person whose evidence the inspector considers likely to be material to the determination of any question relevant to the subject of the inquiry;

(b) take evidence on oath; and

(c) require the production of any relevant book or document in the possession or control of any person.

(3) The inspector shall give three days' written notice of the time and place of the inquiry to the holder or manager of the mine which is the subject of the inquiry and the holder or manager shall on receipt of the notice, ensure that all persons who are required to attend the inquiry are notified of the time and place of the inquiry.

(4) A person who, without reasonable cause, neglects or fails to attend an inquiry on being summoned or who on attending an inquiry refuses to answer any question or produce any relevant book is liable to pay to the Commission a penalty of not more than ten thousand United States dollars.

(5) The holder or the manager of the mine may attend or be represented at the inquiry and the Chief Inspector may allow any other person to appear or to be represented at the inquiry.

### **Regulation 17—Reports of inquiry to Chief Inspector of Mines**

An inspector shall forward to the Chief Inspector,

(a) the transcript of the evidence taken at the inquiry;

(b) the findings as to the cause of the subject matter of the inquiry; and

(c) any recommendations that the inspector considers necessary to make.

(2) Where loss of life results from an accident or a dangerous occurrence associated with mine operations, the Chief Inspector shall forward to the Coroner a copy of the transcript of the evidence and the findings of the inspector.

(3) The Chief Inspector

(a) shall forward the findings of the inspector to the holder or manager of the mine or prospecting operation where an inquiry has been held, and

(b) may direct to be taken, action that appears to be necessary to rectify the conditions found to be the cause of the occurrence, and to ensure the safety of the mine, or prospecting operation.

#### **Regulation 18—Negligence or incompetence of person holding permit or certificate**

(1) Where it appears to the inspector in the course of an inquiry into an accident or dangerous occurrence resulting from mining operations that the accident or dangerous occurrence was the result of the negligence or incompetence of a person who holds a permit or a certificate under these Regulations, the inspector may invite the person to appear before the inspector to show cause why that person's permit or certificate should not be suspended or cancelled.

(2) Where a person is found in an inquiry to have been negligent or incompetent the inspector shall as soon as possible submit a report of the findings together with the inspector's recommendations to the Chief Inspector.

(3) The Chief Inspector, on consideration of the findings and recommendations

(a) may cancel or suspend the permit or certificate of that person, or impose some other penalty;

(b) may record on the permit or certificate details of the cancellation or suspension or other penalty imposed; and

(c) shall give notice as set out in Form Ten of the First Schedule of the endorsement, cancellation or suspension of the permit or certificate to the affected holder or manager.

(4) The Chief Inspector shall maintain records of endorsed, cancelled or suspended permits or certificates.

#### **Regulation 19—Inquest by coroner**

(1) Where at an inquest by a Coroner

(a) it appears that the death is the result of an accident associated with mining operations and occurred in or in relation to a mine or prospecting operation; and

(b) an inspector is not present, the Coroner shall summon the inspector to attend the inquest.

(2) Where there is evidence that the cause of the accident is due to

(a) negligence on the part of a person having control of, or employed in or in relation to a mine, or prospecting operation or any part thereof; or

(b) any defect in or related to the mine or prospecting operation, the Coroner shall give notice in writing to the Chief Inspector, the Attorney General and the holder or manager of the mine or prospecting operation to appear at the inquest.

#### **Regulation 20—Participation of inspector at inquest**

An inspector who is present at an inquest concerning a death that is the result of an accident or dangerous occurrence associated with the operations in a mine or with a prospecting operation, may examine and cross examine a witness who gives evidence at the inquest and address the Coroner on the evidence.



## Improvement and prohibition notices

### **Regulation 21—Improvement notice**

(1) Where an inspector has reasonable grounds to suspect that a person in a mine or engaged in a prospecting operation

(a) is contravening any provision of these Regulations; or

(b) has contravened any provision of these Regulations in circumstances that make it likely that the contravention will continue or be repeated; or

(c) is involved in an activity or a practice which is dangerous, the inspector may give an improvement notice as set out in Form Two of the First Schedule to the holder or the manager of the mine which requires that person to take the necessary remedial action.

(2) An improvement notice shall

(a) state the grounds for the notice, which shall be reasonable;

(b) specify the respective provisions of these Regulations which have been contravened;

(c) state the action required to remedy the situation;

(d) state the time by which the manager is required to remedy the matter or activity; and

(e) state the right to have the notice reviewed in accordance with regulation 4.

(3) A holder or the manager of a mine, who is given an improvement notice; and who fails to comply with the notice within the time specified in the notice, is liable to pay to the Commission in the first instance a penalty of not more than ten thousand United States dollars and to a further penalty of two hundred United States dollars for each day that the notice is not complied with.

(4) Where an improvement notice is complied with, the manager of the mine shall give written notice of the compliance as soon as practicable after the compliance to the inspector who issued the notice; or if that inspector is not available at the relevant time, to the office of the Inspectorate Division.

(5) A holder or the manager of a mine who fails to submit a written notice of compliance where that holder or manager is required to do so is liable to pay to the Commission in the first instance a penalty of not more than ten thousand United States dollars and to a further penalty of two hundred United States dollars.

(4) Where an improvement notice is complied with, the manager of the mine shall give written notice of the compliance as soon as practicable after the compliance to the inspector who issued the notice; or if that inspector is not available at the relevant time, to the office of the Inspectorate Division.

(5) A holder or the manager of a mine who fails to submit a written notice of compliance where that holder or manager is required to do so is liable to pay to the Commission in the first instance a penalty of not more than ten thousand United States dollars and to a further penalty of two hundred United States dollars.

## **Regulation 22—Prohibition notice**

(1) Where an inspector has reasonable grounds to suspect that a mine or prospecting operation

(a) is contravening any provision of these Regulations and that the contravention constitutes or is likely to constitute a hazard to any person or to the environment; or

(b) has contravened any provision of these Regulations in circumstances that make it likely that the contravention will continue or be repeated and that this contravention constitutes or is likely to constitute a hazard to any person or to the environment; or

(c) is using a practice which is dangerous and constitutes or is likely to constitute a hazard to any person or to the environment,

the inspector may issue to the holder or manager of the mine or the prospecting operation a prohibition notice as set out in Form One of the First Schedule

(2) The prohibition notice may require the holder or the Manager of the mine or prospecting operation to

(a) stop work at the mine or prospecting site or any specified part of the mine;

(b) refrain from doing any specified thing at or in relation to the mine or prospecting site;

(c) remove persons from the mine or prospecting site or any specified part of the mine; or

(d) take any or all of the steps specified in paragraphs (a), (b) and (c), and the prohibition notice may provide either with or without conditions or restrictions for,

(i) a specified work, practice or activity to be carried out or any specified thing to be done in the mine or prospecting site; or

(ii) a specified person to be at the mine or prospecting site or the part concerned.

(e) to take remedial action in relation to the matter or activity; and

(f) comply with any requirements until the relevant matter or activity has been remedied or the hazard or the likelihood of hazard has been removed.

(3) A prohibition notice shall

(a) state the grounds for the prohibition notice which shall be reasonable;

(b) specify the provisions of these Regulations which have been contravened;

(c) specify the remedy required under sub-regulation (2); and

(d) state the right of the holder or manager of the mine to have the notice reviewed in accordance with regulation 4.

(4) A holder or manager of a mine who is issued with a prohibition notice and fails to comply with

(a) the notice; or

(b) any other requirement of the notice,

is liable to pay to the Commission a penalty of not more than ten thousand United States dollars.

Notices and documents to be sent to Inspectorate Division

**Regulation 23—Notifications of activities and appointment of managers**

(1) A holder or a manager of a mine shall give written notice to the Chief Inspector as set out in Form Eleven of the First Schedule at least six weeks before work is commenced, recommenced, discontinued or abandoned in a mine.

(2) A holder or the manager of a mine shall

(a) before the commencement of an activity in the mine, give notice to the Chief Inspector in writing, stating the name and qualifications of the manager; and

(b) give prior notice to the Chief Inspector of a change of the manager.

(3) A holder or the manager of a mine shall give notice to the Chief Inspector of any change of name and address of the company or syndicate controlling the mine.

(4) Where the name and address of only one person is furnished for registration as the manager of more than one mine the Chief Inspector may

(a) by written notice, require the holder to appoint, within the time specified in the notice, a different manager for each mine; and

(b) refuse to register the name of the manager for more than one mine.

(5) The holder of a reconnaissance licence or prospecting licence granted under the Act shall appoint a person to be in charge of the operations authorised under the licence.

(6) The person appointed under subregulation (5) shall be a person who is aware of the responsibilities of that position under the Act and these Regulations.

(7) The holder shall give notice of

(a) the appointment in writing to the Chief Inspector before work is commenced in the area to which the licence relates, and

(b) a change in the appointment before the change is made.

(8) A holder who fails to comply with this regulation is liable to pay to the Commission in the first instance a penalty of not more than ten thousand United States dollars and to a further fine of two hundred United States dollars for each day that the notice of appointment or change in appointment is not given.

(9) The Chief Inspector shall

(a) keep a register which shall contain the name and address of each mine and the name and address of the holder or the manager of each mine;

(b) keep a register of persons in charge of a reconnaissance or prospecting area and of the name and number of the licence for the area of which that person is in charge; and

(c) issue to the holder or the manager of each mine that is registered, a certificate of the registration, as set out in Form Twelve of the First Schedule, a copy of which certificate shall be kept on the record of the mine.

**Regulation 24—Notification of commencement or termination of employment of statutory personnel**

- (1) A manager of a mine, or the manager's appointed representative shall before the commencement and within one week of termination of the employment of a holder of a Certificate of Competency or of any other person who is to have or has had control of a section in the mine, give notice to the Chief Inspector of the date of commencement or termination.
- (2) The manager shall keep a record of each statutorily employed personnel.

**Regulation 25—Plans to be deposited with the Chief Inspector of Mines**

- (1) A holder or a manager shall submit copies of the plans mentioned in regulations 57 and 58 to the Chief Inspector and the plans shall be brought up to date to the thirty-first day of December of each year.
- (2) The plans shall be submitted to the Chief Inspector of Mines not later than the 31st day of January in each year.
- (3) The holder or the manager shall deposit with the Chief Inspector at the request of the Chief Inspector a true copy of each plan or section which relates to the mine.
- (4) The holder or manager shall submit the plans in both hard and electronic copies and where the plans are in hard copy they shall be made of durable material.

**Regulation 26—Reporting of accidents**

- (1) A holder or a manager of a mine or prospecting operation shall report on an accident related to the operations in the mine to the Chief Inspector and the nearest inspector,
  - (a) where the accident causes
    - (i) loss of life;
    - (ii) fracture of the skull or limb or spine, or loss of a limb or electrical shock or burns; or
    - (iii) injury to more than two persons,the accident shall be reported immediately to the Chief inspector and the nearest inspector by telephone or the quickest means of communication;
  - (b) where the accident causes bodily injury to a person that makes that person unfit to do normal work for a period of more than fourteen days, the accident shall be reported to the nearest inspector within three days;
  - (c) where the accident causes bodily injury to a person that makes that person unfit to do normal work for a period of more than three working days but less than fourteen days, the accident shall be reported to the nearest inspector within seven days; and
  - (d) any other accident that involves bodily injuries other than those provided for in paragraphs (a), (b) and (c) shall be reported to the Chief Inspector as set out in Form Thirteen of the First Schedule.

(2) The accidents mentioned under sub-regulations 1(a), 1(b) and 1(c) shall be reported in writing as set out in Form Fourteen of the First Schedule and the report shall

(a) contain a full account of the nature and extent of the accident and, so far as is known, of the causes; and

(b) be sent to the Chief Inspector and copied to the nearest inspector within seven days after the accident.

(3) In the case of death from the accident, the holder or manager shall ensure that the Police are notified immediately by the quickest means possible.

(4) Where an accident has caused immediate loss of life or severe injury to more than two persons in a mine, the site of the occurrence shall remain undisturbed, apart from the disturbance which results from the rescue of a person or the removal of a dead body, until an inspector has the opportunity to visit and view the area.

(5) Despite sub-regulation (4), the area of an accident as provided for under that sub regulation may be disturbed, where the holder or the manager of the mine has reason to believe that further danger will result from leaving the area undisturbed.

(6) The Chief Inspector may exercise the powers of an inspector under regulation 2 and direct an authorised person to inspect the scene of an accident, but the scene of an accident shall not remain undisturbed for a period longer than is practicable.

(7) Where the holder or the manager of the mine exercises that holder's or manager's discretion under subregulation (5) to disturb or continue work at the scene of a fatal accident, that holder or manager shall only do so after that holder or manager has taken pictures and measurements of the place which will enable the inspector to be shown the exact condition of the place immediately after the accident.

(8) Where notice is not given as required under subregulation (1), the holder or manager of the mine commits an offence and is liable on summary conviction to a fine of not more than one thousand five hundred penalty units or a term of imprisonment of not more than five years or to both.

### **Regulation 27—Reporting of dangerous occurrences**

(1) The holder or manager of a mine in which there is a dangerous occurrence or the manager of a prospecting operation in the course of which there is a dangerous occurrence shall report the occurrence as set out in Form Fifteen of the First Schedule to the Chief Inspector with a copy to the nearest inspector.

(2) The following dangerous occurrences in a mine shall be reported immediately by telephone to the Inspectorate Division.

(a) the explosion of gas, an explosion caused by electricity, the uncontrolled initiation of explosives, or any issue of flammable gas in underground workings;

(b) an outbreak or occurrence of fire whether on the surface or underground or an indication of spontaneous combustion in the underground workings;

- (c) a rock burst, seismic activity underground or an extensive caving or subsidence in any part of the mine area or workings;
- (d) an abnormal fall of ground;
- (e) a mud rush in or flooding of a portion of the underground workings;
- (f) a case of unconsciousness arising from heatstroke or inhalation of fumes or poisonous gas;
- (g) the failure of winding equipment which involves
  - (i) an essential part of winding equipment which includes the drum or drum shaft, couplings, clutch, bearings, electric motors or electrical control and switchgear;
  - (ii) a winding rope or attachment from a winding rope to a cage, skip or conveyance or to a drum;
  - (iii) a head-frame, sheaver or the axle or sheaf bearing or the rim of the sheaf;
  - (iv) a brake;
  - (v) over-speed or over-winding preventing device or slack rope detector device;
  - (vi) arresting device for a cage, skip or conveyance at the top of a shaft;
  - (vii) a depth indicator;
  - (viii) the derailment of a cage, skip or conveyance;
  - (ix) a serious jamming of a cage, skip or conveyance in a shaft;
  - (x) a winding engine running out of control;
  - (xi) an over-wind;
- (h) a serious faulty behaviour of a processing plant and tailing storage facility which includes
  - (i) spillage of reagents or tailings into the environment;
  - (ii) overtopping of a tailings dam; or
  - (iii) instability of a tailings dam embankment
- (i) a serious occurrence at an open cast mine which includes
  - (i) slope and other rock failures; or
  - (ii) flooding of open pit workings;
- (j) in general, an occurrence which has the potential
  - (i) to cause serious injury to more than two persons;
  - (ii) to cause serious damage to major equipment or property which is likely to impede or restrict normal operations;
  - (iii) to cause major damage to mechanical or electrical equipment power generating equipment and major electrical control and distribution equipment;
  - (iv) to cause major damage to the environment, or mine, or prospecting operation; or

(v) theft of reagents and explosives; and

(k) any other occurrence that the Chief Inspector may in writing notify a holder, or manager of a mine to be a reportable dangerous occurrence.

(3) A dangerous occurrence report under sub-regulation (2), in addition to being made by telephone shall be

(a) in writing as set in Form Fifteen the First Schedule and contain full account of the nature and extent, so far as is known, of the causes; and

(b) sent to the Chief Inspector and copied to the nearest inspector within three days of the dangerous occurrence.

(4) Where notice is not submitted as required by sub-regulation (1), the holder or manager of the mine is liable pay to the Commission a penalty of not more than ten thousand United States dollars and to a further penalty of one thousand dollars for each day the report is not submitted.

#### Returns for statistical purposes

#### **Regulation 28—Monthly and quarterly returns**

(1) A holder or the manager of a mine, from which mineral products are obtained shall submit to the office of the Chief Inspector the following returns:

(a) monthly returns which include

(i) production returns;

(ii) environmental report;

(iii) accidents report; and

(iv) occupational health report

(b) quarterly returns which includes

(i) occupational health report; and

(ii) labour employed and mine development report.

(2) The returns shall be

(a) complete and correct, written intelligibly and be as set out in Forms Sixteen A to K of the First Schedule for that purpose by the Chief Inspector of Mines;

(b) signed by the manager of the mine; and

(c) submitted not later than the end of the month immediately following the period to which the returns relate.

### **Regulation 29—Forms obtainable from Inspectorate Division**

The form for filing the returns required under regulation 28 shall be obtained from the office of the Inspectorate Division.

### **Regulation 30—Other returns to be submitted where required**

(1) A holder or the manager of a mine shall, in addition to the returns required under regulation 28, submit other returns and information on request by the Inspectorate Division for the purposes of statistical information and the preparation of the Inspectorate Division annual report.

(2) Returns or information required under sub-regulation (1) shall be submitted within the time specified by the Chief Inspector of Mines.

### **Regulation 31—False returns**

(1) A holder or the manager of a mine who submits returns which that holder or manager knows or ought to know is false, is liable to pay to the Commission a penalty of not more than two thousand United States dollars.

(2) Where the submission of returns under sub-regulation (1) is tainted with fraud, the holder or manager who submitted the returns is liable on summary conviction to a term of imprisonment of not more than five years.

### Management of mines

#### **Regulation 32—Holder to make financial provision**

The holder of a mining lease or restricted mining lease shall make financial and other provisions and take other steps that are necessary to ensure that the mine is managed and worked in accordance with the requirements of these Regulations.

#### **Regulation 33—Appointment of Mine Manager**

(1) The holder of a mining or restricted mining lease shall, with the approval of the Chief Inspector and prior to the commencement of mining operations, appoint a certified manager for the mine.

(2) Except as provided in these Regulations, a holder of a mining lease or a restricted mining lease, shall not appoint or allow a person who does not hold the manager's qualification specified in these Regulations to be the manager of the mine.

(3) The holder of a mining or restricted mining lease may appoint a deputy manager for the mine to

(a) assist the manager; and

(b) carry out the duties of the manager where the manager is absent or otherwise unable to carry out the manager's duties.



### **Regulation 34—Obligation of holder to always have a manager on site**

- (1) The holder of a mining lease or restricted mining lease shall always have a manager on site in the mine.
- (2) Where the manager or deputy manager of a mine
  - (a) is incapacitated by illness or accident;
  - (b) or will be absent from the mine, the holder of the mining lease for that mine shall
  - (c) appoint a competent person, who holds a manager's certificate, approved by the Chief Inspector, to act as the temporary manager during the period of incapacity or absence, and
  - (d) promptly give notice to the Chief Inspector of the appointment of the temporary manager and the reason for the appointment and inform the temporary manager of that notice.
- (3) Where the holder of a mining lease or restricted mining lease fails to give notice under sub-regulation (1), the person acting as manager of the mine shall immediately inform the Chief Inspector of the incapacity or absence of the substantive manager and that person shall be deemed to be manager for the purposes of these Regulations.
- (4) A temporary manager appointed under sub-regulation (2), is subject to the same obligations and liabilities as the manager.
- (5) An appointment as temporary manager under sub-regulation (2), shall not, except with the written permission of the Chief Inspector, be for a period longer than two months.

### **Regulation 35—Responsibility for working**

The manager of a mine shall control the working of the mine and is responsible for the enforcement of these Regulations in relation to the mine.

### **Regulation 36—Qualification of managers, underground managers and mine captain in underground mines.**

- (1) A person shall not perform or be permitted to perform the functions of a manager, underground manager, or a mine captain in any underground working in a mine unless that person proves to the satisfaction of the Chief Inspector of mines that that person
  - (a) holds a recognised degree or diploma in mining, or an equivalent qualification and in addition has complied with the examination requirements;
  - (b) does not possess the educational qualifications provided in paragraph (a) but qualifies to be appointed a mine captain because that person has complied with the provisions of the examination requirements;
  - (c) in the case of a mine which employs not more than thirty persons underground, has had at least three years practical underground mining experience exclusive of surveying and sampling, or has successfully passed through the curriculum of a recognised mining school or academy and has two years practical underground experience;

(d) holds a certificate of competency to conduct blasting operations issued by the Chief Inspector as set out in Form Forty A of the First Schedule.

(e) has satisfied a board of examiners appointed by the Chief Inspector, which board comprises at least one senior mine official, of that person's knowledge of mining and these Regulations; and

(f) holds a certificate from a qualified medical practitioner which states that that person has sound sight and hearing and is not subject to any bodily or mental infirmity likely to interfere with the efficient discharge of duties.

(2) The approval of the Chief Inspector of Mines shall be obtained by application to the Chief Inspector of Mines and the application shall be in the form set out in Form Forty B of the First Schedule.

(3) An underground manager or a mine captain shall not be more than forty-five years old and shall in addition hold a recognised

(a) first aid certificate; and

(b) Mine Rescue Brigade Certificate as set out in Form Forty C of the First Schedule.

(4) The Chief Inspector of Mines may exempt an underground manager or mine captain from the requirements of sub-regulation (3).

### **Regulation 37—Qualification of managers, mine superintendent and mine captain in open pits**

(1) A person shall not perform, or be permitted to perform the functions of a mine manager, mine superintendent or mine captain in relation to any surface working in an open pit mine other than a quarry or digging area, unless that person proves to the satisfaction of the Chief Inspector of Mines that that person

(a) holds a recognised degree or diploma in mining or metallurgy, or an equivalent qualification and in addition has complied with the examination requirements;

(b) does not possess the educational qualifications provided in paragraph (a) but qualifies to be appointed a mine captain because that person has complied with the provisions of the examination requirements;

(c) in the case of a mine employing not more than fifty persons has had at least two years practical mining or metallurgical experience, exclusive of surveying and sampling, or has successfully passed through the curriculum of a recognised mining school or academy, and has one year practical mining or metallurgical experience; or

(d) if employed in a mine in which explosives are used, holds a certificate of competency to conduct blasting operations issued by the Chief Inspector as set out in Form Forty D of the First Schedule;

(e) has satisfied a board of examiners appointed by the Chief Inspector at least one member of which board is a senior mine official as to that person's knowledge of mine and these Regulations; and

(f) holds a certificate from a qualified medical practitioner which states that the person has sound sight and hearing and is not subject to any bodily or mental infirmity likely to interfere with the efficient discharge of that person's duties.

(2) The approval of the Chief Inspector of Mines shall be obtained by application to the Chief Inspector of mines and the application shall be in the form set out in Form Forty B of the First Schedule.

(3) A mine Superintendent or a mine captain shall in addition to the required qualifications, hold a first aid certificate obtained from an institution approved by the Chief Inspector.

#### **Regulation 38—Qualification of managers of quarries**

A person shall not perform or be permitted to perform the functions of a manager in a quarry unless that person

(a) holds a recognised degree or diploma in mining, or an equivalent qualification and in addition has complied with the examination requirements;

(b) holds a Certificate of Competency to conduct blasting operations as issued by the Chief Inspector of Mines under the Minerals and Mining (Explosives) Regulations 2012 (L.I. 2177); and

(c) has satisfied a board of examiners appointed by the Chief Inspector which board comprises at least one senior mine official.

#### **Regulation 39—Appointments not to relieve manager of personal responsibility**

(1) The manager of a mine may appoint one or more persons who satisfy the qualifications requirements of regulations 36, 37, 38 and 221 to assist in the management and control of the mine.

(2) A person appointed under sub-regulation (1) has the same responsibility under these Regulations as the manager of the mine, as specified in the letter of appointment but that appointment shall not relieve the substantive manager of personal responsibilities under these Regulations.

(3) An appointment under sub-regulation (1) shall be in writing and clearly define the portion of the mine, assigned to the person appointed to manager.

(4) A copy of the letter of appointment shall be forwarded to the Chief Inspector.

#### **Regulation 40—General responsibility of manager**

Where these Regulations require the performance of a function or impose a duty in relation to work in a mine and does not specify the person to perform that function or discharge that duty, the manager is responsible for the performance of that function or discharge of that duty.

#### **Regulation 41—Responsibility for accidents which occur through incompetence of workmen**

(1) The manager of a mine is responsible for an accident caused by the incompetence or inexperience of a workman employed in dangerous work in the mine, unless the manager can prove that proper precautions were taken by the manager.

(2) Where an accident results in injury to a person because of that person's illegal activity in or in relation to a mine, or prospecting area the manager of the mine, or prospecting area is not responsible for the injury, if the manager has taken reasonable steps to curb the illegal activity.

#### **Regulation 42—Responsibility of manager for safety, health and environment**

A manager shall

- (a) ensure that these Regulations and any lawful order given by an inspector in the interest of safety, health and environment are observed by every person employed at the mine;
- (b) appoint persons that are necessary to assist in the enforcement of these Regulations; and
- (c) provide for the safety and health, proper discipline of persons employed and the protection of the environment in the mine.

#### **Regulation 43—Records to be kept by Mine Manager**

(1) The manager of a mine, shall maintain records in relation to the mine.

(2) The records shall include

- (a) inspection reports, decisions and orders given by an inspector;
  - (b) details of boilers and pressure vessels in use and statutory certificates of tests in relation to the boilers and pressure vessels as required by these Regulations;
  - (c) details of each rope in use for winding purposes and statutory certificates of tests in relation to the ropes as required by these Regulations;
  - (d) details of every winding equipment test and statutory certificates of the tests as required by these Regulations;
  - (e) copies of statutory certificates and licences and medical reports in relation to those persons engaged in the mine who require the certificates, licences or reports to authorise them to carry out their duties,
  - (f) particulars of each accident and dangerous occurrence required to be reported under regulations 26 and 27, and
  - (g) any other matter required by an inspector to be placed on the record.
- (2) Each page of the records kept under this regulation shall be numbered and indexed.
- (3) The records shall be kept at the office of the mine, and shall be opened at reasonable times for examination by
- (a) an inspector;
  - (b) an authorised person employed in or in connection with the mine; or
  - (c) a person authorised in writing by the Chief Inspector to examine the records.

(4) The Public Records and Archives Administration Act, 1997 (Act 535) shall with modifications that are necessary apply to these Regulations.

**Regulation 44—Manager to ensure duties are assigned to competent persons**

The manager of a mine shall appoint competent persons to be responsible for an inspection, an examination or other duty required under these Regulations.

**Regulation 45—Appointment and qualification of shift boss and mining foreman**

(1) The manager of a mine shall appoint competent persons to act as shift bosses or mining foremen and the manager shall give notice to the Chief Inspector of the appointment.

(2) A person shall not perform or be permitted to perform the functions of a shift boss or mining foreman unless that person holds a certificate of competency granted by the Chief Inspector as set out in Form Forty F of the First Schedule.

(3) The certificate of competency shall be obtained by application to the Chief Inspector of mines and the application shall be in the form set out in Form Forty E of the First Schedule.

(4) The Chief Inspector shall only grant a certificate of competency to an applicant, if the applicant

(a) is literate;

(b) holds a recognised First Aid Certificate;

(c) holds a Certificate of Competency issued by the Chief Inspector to conduct blasting operations;

(d) has complied with the provisions of the examination requirements; and

(e) produces a certificate from a duly qualified medical practitioner that the applicant has sound sight and hearing and does not have any infirmity that is likely to interfere with the efficient discharge of the duties of a shift boss or mining foreman.

(5) An applicant for the position of a shift boss shall

(a) hold a Mine Rescue Brigade Certificate as set out in Form Forty C of the First Schedule; and

(b) not be more than forty-five years old.

(6) An inspector may endorse, suspend or cancel a Certificate of Competency granted under these Regulations to a person who is a shift boss or mining foreman if in the opinion of the Chief Inspector that person has been

(a) inattentive or negligent in the execution of the duties of a shift boss or mining foreman as specified in these Regulations; or

(b) involved in any act of misconduct likely to be detrimental to the efficient discharge of the duties of the position.

(7) The inspector shall report to the Chief Inspector within forty-eight hours any endorsement, suspension or cancellation made under sub-regulation (6), and a shift boss or mining foreman

affected by the endorsement, suspension or cancellation may, appeal under regulation 4 against the endorsement, suspension or cancellation within fourteen days.

**Regulation 46—Manager or mine captain not to act as shift boss or mining foreman**

The manager of a mine, an underground manager of a mine, a mine superintendent or a mine captain shall not regularly perform the functions of a shift boss or mining foreman except with the written permission of an inspector.

**Regulation 47—Duties of shift boss and mining foreman**

(1) A shift boss or mining foreman shall be in charge during a shift in a section of a mine other than a quarry, works or associated plant, and the section shall be clearly defined in writing by the manager, underground manager, mine superintendent or mine captain to the shift boss or mining foreman concerned.

(2) A shift boss or mining foreman shall

(a) ensure that the requirements of these Regulations are properly observed by a person working under that shift boss or mining foreman, and

(b) report in writing to the manager, underground manager, mine superintendent or mine captain any contravention of these Regulations within forty-eight hours after the contravention.

(3) Where the contravention

(a) occurs in a section of the mine, or

(b) is by a person

not under the immediate control of the boss or foreman, the shift boss or mining foreman is not relieved from the responsibility of reporting the contravention, if the shift boss or mining foreman is aware of the contravention

(4) Except in an emergency that relates to safety and health and which prevents a shift boss or mining foreman from carrying out an inspection, each shift boss or mining foreman shall at least once during that shift boss' or mining foreman's shift inspect every place of that shift boss' or mining foreman's section of the mine in which a person is working or through which a person may have occasion to pass.

(5) A shift boss or mining foreman shall ascertain the conditions of safety, ventilation, sanitation, the presence of gases and dust and other matters in the mine that concern the safety and health of the persons working under the supervision of that shift boss or mining foreman.

(6) Where the substantive shift boss or mining foreman is absent, by working places of the section shall be inspected by either the mine captain or another shift boss or mining foreman.

(7) Where a section of the mine is being worked by a contractor, the contractor shall appoint shift bosses and mining foremen to perform the functions stated in sub-regulations (4), (5) and (6).

(8) A shift boss or mining foreman shall ensure that at any time in any working place in the section under the supervision of that boss or foreman where operations are carried out, only one person is in charge at that working place.

(9) A shift boss or mining foreman

(a) shall be physically present in the section when work is being carried out in the section of that boss or foreman; and

(b) is responsible for the whereabouts and evacuation of the workmen in the section during an emergency.

(10) A shift boss or mining foreman shall, at the completion of the shift of that boss or foreman record in ink, in a book provided by the manager for the purpose and to be kept in a place appointed by the manager the particulars of

(a) the condition in which the boss or foreman found each working place and travelling way;

(b) any breach of these Regulations which the boss or foreman has observed and in respect of which the boss or foreman has taken action or in respect of which the boss or foreman considers action should be taken;

(c) instructions for the purpose of securing safety, health and environment that the boss or the foreman may have given during the shift;

(d) any place in which a person was working in the section under the charge of the boss or foreman which was not visited and the reasons why that place was not visited; and

(e) matters that require the attention of the relieving shift boss or mining foreman with regard to safety, health and the environment.

(11) The records shall be

(a) examined and countersigned by the manager, underground manager, mine superintendent or the mine captain at least once every day; and

(b) opened for inspection by an inspector at reasonable hours.

#### **Regulation 48—Continuity of responsibility of manager and mine captain**

A manager, underground manager, mine superintendent or mine captain is not relieved of any personal responsibility under these Regulations because of the appointment of a shift boss or mining foreman by the manager, underground manager, mine superintendent or mine captain.

#### **Regulation 49—Appointment of fire patrols in underground mines**

(1) A manager shall appoint in writing an adequate number of fire patrols, with each patrol consisting of not less than two persons.

(2) A patrol shall pass through and examine at the end of each shift and on non-working shifts, all underground travelling ways which contain timber and other combustible material for the purposes of prevention or abatement of fire and to provide precaution against fire.

### **Regulation 50—Machinery to be under charge of competent resident engineer**

A competent resident engineer shall be in charge of boilers, engines and other machinery, which includes electrical apparatus and installations in a mine where the total rating of mechanical apparatus installed in the mine exceeds 750KW.

### **Regulation 51—Qualification of resident engineer**

(1) A person may perform the functions of a resident engineer in a mine, if that person proves to the satisfaction of the Chief Inspector that that person

(a) holds a recognised degree or diploma in mechanical, electrical or electromechanical engineering, or an equivalent qualification and in addition has complied with the examination requirements;

(b) has satisfied a board of examiners comprising at least one resident engineer, of that person's knowledge of these Regulations, and of the installation, commissioning, maintenance, and decommissioning practices of machinery, plants and equipment on the mine; and

(c) has at least five years relevant practical experience.

(2) The Chief Inspector shall appoint the board of examiners under sub-regulation (1).

### **Regulation 52—Engineering personnel below the rank of resident engineers to be certified**

(1) Where the equipment at a mine cannot be supervised by the resident engineer alone, a competent person may, depending on the size and complexity of the operations, be certified and appointed as

(a) plant engineer or engineering superintendent; or

(b) senior engineer or section engineer.

(2) The certification of a person appointed in subregulation (1) shall be by a board of examiners appointed by the Chief Inspector and shall be based on an examination which shall test that person's knowledge of

(a) specialised plant engineering practice with regard to installation, commissioning, maintenance and decommissioning of mine plants, equipment and machinery; and

(b) these Regulations.

### **Regulation 53—Inspecting engineer**

A competent inspecting engineer shall inspect, boilers, engines and other machinery, which includes electrical apparatus and installations in a mine where the total rating of mechanical apparatus installed in the mine is less than 750 KW.



### **Regulation 54—Qualification of inspecting engineer**

(1) A person may perform the functions of an Inspecting Engineer in a mine, if that person proves to the satisfaction of the Chief Inspector of Mines that that person

(a) holds a recognised degree or diploma in mechanical, electrical or electromechanical engineering, or an equivalent qualification and in addition has complied with the examination requirements;

(b) has satisfied a board of examiners at least one member of which is a resident engineer as to that person knowledge of these regulations, and the installation, commissioning, maintenance, and decommissioning practices of machinery, plants and equipment on the mine, and

(c) has had at least three years relevant practical experience.

(2) The Chief Inspector shall appoint the board of examiners under sub-regulation (1).

### **Regulation 55—Responsibility of manager for persons employed by contractors**

The manager of a mine is not relieved of any personal responsibility under these Regulations because of the employment by a contractor of a person required to be employed under these Regulations.

### Offences

#### **Regulation 56—Offences**

(1) A person who contravenes a decision or order made in pursuance of these Regulations is liable to pay a penalty to the Commission.

(2) An inspector may in respect of a contravention under sub-regulation (1) impose a penalty of not more than ten thousand United States dollars to be paid to the Commission.

(3) A person who contravenes any of the provisions of these Regulations for which a penalty is not provided is liable to pay to the Commission, in the case of a body corporate, partnership, co-operative, association or group a penalty of not more than ten thousand United States dollars and in the case of an individual, a penalty of not more than five thousand United States dollars.

### Mine plans

#### **Regulation 57—Plans of underground mines**

(1) A holder or manager of an underground mine shall cause to be prepared by a certified surveyor accurate plans of all underground workings of the mine, surface workings, buildings, and other features that the Chief Inspector may require, and the plans shall be maintained up to date and kept in an office at the mine.

(2) The plans to be prepared and kept under sub-regulation (1) include

(a) a general surface plan, of the mineral right or rights which shows

(i) the boundaries of the mineral right or rights;

(ii) outcrops and dip of the reef or reefs or other mineral or alluvial deposits known or which are being worked,

(iii) open pits or surface workings, shafts, boreholes, reservoirs, tailings sites, railways, permanent pipelines, aerial cable ways, electric power lines, and tram-ways erected or constructed for the use of the mine

(iv) buildings, water courses, and

(v) other surface objects within the area of the surface of the land required for mining purposes;

(b) an underground plan, which shows clearly

(i) the boundaries of the mineral right;

(ii) the position of shafts, drives, winzes, raises, cross-cuts, stopes, safety pillars, stations, and underground explosives and magazines;

(iii) veins, spurs, or leaders that are being exploited;

(iv) faults and dykes and datum levels,

(v) important changes in the dip of the reef or mineral deposits;

(vi) the system of ventilation throughout the mine; and

(vii) the direction of main currents and positions of doors, stopping, crossing, and main ventilating appliances;

(c) a general underground plan containing the particulars specified in Sub-regulation 2(b), but drawn to the same scale as the general surface plan in sub-regulation 2(a);

(d) a plan which shows the transverse section or sections of the workings and drawn through the shaft or shafts of the property, indicating clearly the dip of the strata and reef or other mineral deposit, and any dislocation of strata or intrusive rock among others; and

(e) where a reef or other mineral deposit has an average dip of more than sixty degrees a plan of the mine workings thereof on durable material which shows the vertical projection.

(3) The plans required under sub-regulation (2), shall in the case of a plan under

(a) paragraph (a), be revised and brought up to date during the months of June and December; and

(b) paragraph (b) be revised and brought up to date every three months.

(4) Where in the preparation of a plan under paragraph (b) of sub-regulation (2), different reefs or mineral deposits lie one above the other, the working of each reef shall, on the request of the inspector be shown on a separate plan.

(5) In a plan made under subparagraphs (vi) and (vii) of paragraph (b) of sub-regulation (2) an intake or downcast current shall be shown in blue wash.

### **Regulation 58—Plans of surface mines**

(1) A holder or the manager of a surface mine shall at the request of the Chief Inspector cause accurate plans of workings, together with sections of the workings to be prepared by a certified surveyor and maintained and kept at an office in the mine by the manager.

(2) The plans to be prepared and kept under sub-regulation (1) include

(a) a general surface plan, of the mineral right which show

(i) the boundaries of the mineral right;

(ii) the outcrops and dip of the reef or reefs or other mineral of alluvial deposits known or which are being worked;

(iii) open pits or surface workings, shafts if any, boreholes, reservoirs, tailing sites, railways, permanent pipelines, aerial cable ways, electric power lines and tramways erected or constructed for the use of the mine;

(iv) buildings, water courses, and

(v) other surface objects within the area of the surface of the land required for mining purposes;

(b) a plan of the workings at different depths sufficiently numerous and suitably chosen to provide together with the plan made under paragraph (c) an approximate estimate of the ground being extracted; and

(c) a plan that shows

(i) traverse sections of the mine and workings suitably chosen to provide together with the plan made under paragraph (b) an approximate estimate of the ground, and the different heights of the ground being extracted, and

(ii) the distinction between the mineral deposit and the different varieties of the country rock.

(3) The plans required under sub-regulation (2), shall in the case of a plan under

(a) paragraph (a), be revised and brought up to date during the months of June and December each year; and

(b) paragraph (b), be revised and brought up to date every three months and the information contained in the plans shall be kept correct to the last measuring date.

(4) The holder and manager of a mine shall keep records that show

(a) the geological nature and widths of strata passed through;

(b) the assay values of any reef or other mineral deposit intersected; and

(c) indications of dips and faults and site plans and sections of boreholes drilled.

(5) The plan required in sub-regulation 2(a) shall be on a scale of either 1 is to 500, 1 is to 2000 or 1 is to 2500 and the plan in sub-regulation 2(b) shall be on a scale of 1 is to 100, 1 is to 200, 1 is to 250 or 1 is to 500.

(6) A holder or the manager of a mine shall maintain a plan of every dam or dump operated by the mine and of any abandoned dam or dump which may affect the mine operations or be affected in any way by the mine operations, or could be of danger to people and animals.

(7) Where a plan is required to be kept in this regulation a true copy of the plan on durable material may be kept instead of the original of the plan.

#### **Regulation 59—Measurements**

In mine surveys, measurements shall be in the International System of Units.

#### **Regulation 60—Co-ordinates and records of surveys**

(1) A person who surveys a mine shall ensure that the co-ordinates of the surface and underground surveys have where practicable the same axis as the co-ordinates of the mining land survey on which the mine is situated.

(2) The co-ordinates of the mining lands beacon shall be obtained from the Mapping and Survey Division of the Lands Commission.

(3) The manager of a mine shall ensure that records of surveys in connection with the mine are

(a) entered into a register kept for that purpose, and

(b) kept up to date.

(4) An inspector may examine a register kept under subregulation (3).

#### **Regulation 61—Permanent bench mark**

(1) The holder or manager of a mine shall

(a) identify on the property of the mine, a suitable permanent stone structure made of concrete which shall be demarcated as a permanent bench mark, and

(b) where there is no suitable permanent stone structure on the property of the mine, build a suitable permanent stone structure for this purpose.

(2) A person who surveys a mine shall ensure that levels taken above and below ground are referred to a plane above the bench mark.

(3) The Director of Surveys shall fix the height of the plane referred to in sub-regulation (2) in each district and each elevation shall be in International Standard of Units.

(4) A person who surveys a mine shall ensure that the plans of a surface mine refer to a datum above sea level and as far as is practicable,

(a) longitudinal sections or projections are to a scale that accords with good engineering practice and that shows underground mining, operations; and

(b) sufficient cross-sections or projections are to a scale that accords with good engineering practice and that clearly shows the ore bodies and the parts of ore bodies mined out.

(5) The plans for a mine shall be

(a) prepared by or under the supervision of a mine surveyor or by some other person of sufficient skill and experience approved by the Chief inspector; and

(b) certified as correct and dated by the mine surveyor or other person approved under sub-regulation (3) under whose supervision the plans were prepared.

(6) The Commission may in a relation to a mine publish guidelines that set out

(a) the technical requirements to be complied with in the preparation of mine plans; and

(b) the format for plans which are to be submitted to the Commission, and the holder or the manager of a mine shall comply with the requirements of the guidelines.

### **Regulation 62—Establishment of beacon**

(1) Where the holder of a mineral right decides to erect beacons in pursuance of these Regulations, that holder shall personally supervise the erection of the beacons and the marking out of the boundaries.

(2) Where the holder of

(a) a reconnaissance licence;

(b) a restricted reconnaissance licence;

(c) a prospecting licence; or

(d) a restricted prospecting licence,

decides not to apply for the grant of a mining lease after that holder has erected beacons in an area, that holder shall personally supervise the removal of the beacons marking out the boundaries.

(3) A person shall not erect a beacon or anything purporting to be a beacon between five o'clock in the evening and eight o'clock in the morning.

(4) The holder of a mineral right which has been surrendered or cancelled or which is expired shall not mark out any area covered by that mineral right either directly or indirectly, until after a period of ninety days from the date of notification by the Commission of that surrender, cancellation or expiry.

### **Regulation 63—Temporary beacon**

(1) A temporary beacon consists of a post with a notice board fixed on it and held firmly in the ground.

(2) A post referred to in sub-regulation (1) shall

(a) not be less than one hundred centimetres long, five centimetres in diameter, if round, or twenty-five centimetres, if square;

(b) consist of one piece of material;

(c) stand in an upright position and the lower end shall be fixed into the ground to a depth of not less than ten centimetres; and

(d) project not less than 1 metre above the ground.

(3) A notice board referred to in sub-regulation (1) shall

(a) be composed of wood or metal and shall not be less than half of a metre square; and

(b) be securely fixed to the upper portion of the post.

(4) The holder of a mineral right shall ensure that

(a) the land to which the right relate is cleared of bush, brushwood and high grass within a distance of five metres from the location of the beacons and corner beacons and kept cleared throughout the duration of the mineral right concerned;

(b) inscriptions on any notice board within the mineral right area are distinctly and legibly marked; and

(c) the notice board of a temporary beacon bears the information required under these Regulations.

(5) The abbreviations in the brackets apply to the following words and may be used on notice boards:

(a) "prospecting licence" (P.L.),

(b) "reconnaissance licence" (R.L.),

(c) "mining lease" (M.L.),

(d) "location beacon" (L.B.)

(e) "direction beacon" (D.B.),

(f) "corner beacon" (C.B.),

(g) "boundary beacon" (B.B.),

(h) "lower beacon" (Low. B.),

(i) "upper beacon" (U.B.), and

(j) "pegged" (P).

(6) Where a beacon by reason of its position appears to be common to contiguous title areas, that beacon may be reckoned as one beacon in respect of each of the areas, if there is information affixed to the post, as specified, in respect of each area.

(7) These Regulations shall not be construed in a manner that prevents a person authorised under these Regulations to erect a temporary beacon from erecting a permanent beacon in place of the temporary beacon.

(8) A person to whom a mineral right is transferred shall, as soon as possible after being given notice of the registration of the transfer, substitute that person's name for the name of the person who transferred the mineral right on beacons in the area covered by the mineral right to which the transfer relate.

#### **Regulation 64—Permanent beacon**

A permanent beacon consists of

- (a) an iron pipe measuring one and a half metres long and eight centimetres in diameter, set in a concrete pillar of one hundred centimetres square, built on a rock foundation or sunk to a depth of one quarter of a metre below the ground; or
- (b) an iron rod or angle iron bar measuring one quarter of a metre long, set in a concrete pillar of one hundred centimetres square, built on a rock foundation, or sunk to a depth of one quarter of a metre below the ground.

#### **Regulation 65—Maintenance of beacon**

A holder of a mineral right shall maintain a beacon and a boundary mark erected on the land to which the mineral right relate in good condition and repair and shall

- (a) keep the area around the beacon or boundary mark clear of high grass, bush and brushwood within a radius of five meters of the beacon or boundary mark; and
- (b) in addition clear and keep clear of vegetation the boundary line of the land to which the mineral right relate for a distance of one meter on each side of the beacon and for width of one metre along the actual boundary line.

#### **Regulation 66—Additional beacons**

(1) The Commission may

- (a) require the holder of a mineral right, or an applicant for a mineral right to erect additional beacons, and clear boundary lines, or parts of boundary lines that the Commission may determine, of bush, brushwood and long grass for a width of one hundred centimetres along the actual boundary line, or
- (b) cause the clearing and demarcation of the boundaries at the expense of the holder or the applicant.

(2) Where the Commission is satisfied that a survey or check survey of a title area is necessary, the Commission may

- (a) cause the survey to be conducted and a map prepared; and
- (b) demand from the applicant, or the holder of the mineral right concerned, the cost of the survey and the map

and the applicant or holder shall, within the time specified in the notice of demand, pay to the Commission the cost of the survey and the map and lodge the original of the licence or lease concerned with the Commission for amendment.

(3) A holder of a mineral right or an applicant for a mineral right other than a reconnaissance licence shall mark out the boundaries of the area covered by the mineral right by erecting beacons on the ground and the area may be adjusted by the Commission in the exercise of the power under sub-regulations (1), (2) and (4).

(4) Where the Commission is satisfied that the area marked out on the ground differs materially in position, shape or area from the area over which the mineral right concerned was applied for or is held, the Commission shall, at the expense of the applicant or holder concerned, make the adjustments to the beacons and boundaries as the Commission considers appropriate and the adjusted boundaries shall become the boundaries of the area applied for or held.

(5) A survey or map made under this regulation is subject to the approval of the Commission.

#### **Regulation 67—Workings to be surveyed before abandoning**

Where a mine is abandoned or ceases operations for a period in excess of three months, the manager shall, where required by the Chief Inspector,

- (a) cause the last survey of the mine to be updated to show final workings; and
- (b) forward to the Chief Inspector a true copy of the plans made.

#### **Regulation 68—Removal of beacon**

(1) Where

- (a) an application for a grant or mineral right is withdrawn or refused, or
- (b) a mineral right is surrendered, cancelled or expires,

the applicant or former holder of the right shall, within thirty days after the date of the withdrawal, refusal, surrender, cancellation or expiry, remove the beacons erected to demarcate the area concerned.

(2) Where a beacon is removed in accordance with sub-regulation (1), the applicant or former holder of the mineral right to which the beacon relate or that applicant's or holder's agent shall personally supervise the removal of the beacon.

(3) Without limiting sub-regulation (3), where an applicant for or the holder of a mineral right fails to comply with sub-regulation (1) or (2), the Commission shall cause the removal of the beacons to be effected by another person at the expense of the applicant or former holder of the mineral right concerned.

(4) A person who contravenes sub-regulation (1) or (2) of this regulation commits an offence under section 106 of the Act.

#### **Regulation 69— Plans to be produced for inspectors or authorised persons**

A holder or manager of a mine shall

- (a) within a reasonable time after a demand has been made for the production of plans, produce the plans of the mine to an inspector or to another officer authorised for the purpose in writing by the Chief Inspector; and
- (b) permit the inspector or authorised person to examine and make copies of a plan or section.



### **Regulation 70—Power of Chief Inspector of Mines to order surveys**

(1) Where the Chief Inspector of Mines believes that a copy of a plan or section of a mine produced in accordance with these Regulations is incorrect or incomplete, the Chief Inspector may cause the matter to be investigated.

(2) The Chief Inspector of Mines may, order a survey of the mine, or that part of the mine to which the plan relates, for the purpose of checking the copy of the plan or section.

(3) The Chief Inspector may require that the costs of the survey be paid to the Commission and the costs shall be a debt to the holder of the mining lease.

### **Regulation 71—Plans of dams, lakes, waste dumps**

The holder or manager of a mine, subject to these Regulations shall

(a) maintain plans and sections compiled by a certified surveyor of any dam natural lake or waste dump used by or operated for the mines, works or associated plant;

(b) make available for inspection copies of the plans and or sections as required by regulation 69; and

(c) submit to the Chief Inspector annually or at another interval that the Chief Inspector may, by order in writing require updated copies of the plans and sections required under sub-regulation (1).

### **Regulation 72—Plans to be confidential**

(1) A person shall not, except with the authority in writing of the Chief Executive Officer of the Commission or the Chief Inspector and for purposes which relate to the interest of the State, make a copy of, or tracing from, any copy of a plan or section

(a) submitted to the Chief Inspector; or

(b) taken by an inspector or authorised person

in accordance with these Regulations, without the consent in writing of the holder of the mineral right or owner of associated plant to which the plan or section relates.

(2) A person who has custody of a copy of a plan or section referred to in subregulation (1) shall not, except with authority and for the purposes or with the consent referred to in sub-regulation (1), allow any person to inspect, or give to any person a description of, or information relating to the copy of the plan or section.

(3) Despite sub-regulations (1) and (2), a person may, on an application to the Chief Inspector, be permitted to examine the copies of the plans or sections of the mine, which are held by the Chief Inspector, where the mineral right or title to any area or mine is surrendered or forfeited.

### **Regulation 73—Penalty on breach of obligations to keep and deposit correct plans**

(1) A holder or the manager of a mine who fails to keep the plans prescribed in these Regulations or neglects to deposit with the Chief Inspector within the prescribed periods true copies of the plans in

accordance with these Regulations is liable to pay to the Commission a penalty of not more than ten thousand United States dollar in the first instance and a further penalty of two hundred United States dollars for each day that the plan required to be deposited with the Chief Inspector is not deposited.

(2) A plan or a copy of a plan deposited with the Chief Inspector and a plan which is updated under these Regulations shall be signed and dated by a surveyor and a holder or manager.

#### **Regulation 74—Withholding or concealing plans, faulty plans**

A holder or the manager of a mine who withholds a part of a plan, or conceals a part of the workings or knowingly or wilfully allows the plan to be or remain incorrect, commits an offence under these Regulations and is liable to pay to the Commission a penalty of not more than ten thousand United States dollars in the first instance and to a further penalty of two hundred United States dollars for each day that a part of a plan is withheld or a part of the workings is concealed.

#### **Regulation 75—Rules with regard to plans by Chief Inspector of Mines**

The Chief Inspector may make rules with regards to plans for the purpose of securing uniformity in colour, and the use of conventional Signs.

#### Exploration

#### **Regulation 76—Cutting and use of grid lines**

A holder or manager of a mine shall ensure that in the mine

- (a) a cut line or walking track does not exceed one metre in width;
- (b) access to a cut line is discreet, to reduce the possibility of subsequent misuse by unauthorised persons;
- (c) a cut line or walking track is made through hand tools including machete, fern hook, axe and chainsaw only;
- (d) debris from the cutting and use of a grid is removed by the person who creates the grid;
- (e) in the creation of a grid, waste oil from machinery used in the process is collected and taken to an appropriate disposal area; and
- (f) where a chainsaw, power auger, or other petrol-driven machinery is used in the creation of a grid there is, within fifty metres from the site, a powder-type extinguisher of not less than five kilogram capacity.

#### **Regulation 77—Tracks**

- (1) A person travelling to a work site shall use existing access roads wherever possible.
- (2) A person who carries on construction in relation to a mine shall

- (a) at the beginning of the construction, clear the vegetation and topsoil from the tracks connected with the construction and store the topsoil separately;
- (b) avoid excessive earthwork; and
- (c) provide adequate drainage.

#### **Regulation 78—Rehabilitation of tracks**

A person who carries out an exploration programme shall rehabilitate the tracks used for the exploration by ripping the soil, spreading topsoil and restoring the vegetation cover of the track.

#### **Regulation 79—Drill pads**

- (1) A holder of an exploration licence or the manager of a mine shall ensure that
  - (a) where for the purpose of an exploration programme or any mining activity a drill pad is required, vegetation at the site where the pad is to be prepared is cleared and the topsoil stockpiled separately from the subsoil; and
  - (b) for the preparation of a drill pad
    - (i) the size of the pad and peripheral disturbance is kept to a minimum; and
    - (ii) fuel, oil and chemical containers is in a sound condition and stored in a steel tub to avoid environmental contamination.
- (2) The manager of an exploration programme or at the site where a drilling pad is prepared shall ensure that
  - (a) there are no leakages from any equipment; and
  - (b) after drilling is finalised the drill pad is cleaned and rehabilitated by ripping the subsoil, replacing topsoil, and restoring the vegetation cover.

#### **Regulation 80—Trenches and pits**

The manager of an exploration programme shall

- (a) during the excavation of trenches or pits, stockpile topsoil separately; and
- (b) post warning signs or erect fences around pits and trenches to prevent a person from falling inadvertently into the excavated trenches or pits.

#### **Regulation 81—Rehabilitation and restoration of vegetation**

- (1) The manager of an exploration programme shall ensure that
  - (a) any land used in an exploration programme is rehabilitated and is as far as possible reverted to the condition in which that land was before the exploration programme;

- (b) rehabilitation earthworks are done when the soil is dry enough to move;
  - (c) seeding and fertilising for the purpose of restoring the vegetation shall be done after the replaced soil has been softened by rains; and
  - (d) after the topsoil has been spread over a disturbed area which has been prepared, vegetation cover is restored and the seeds for the restoration are collected from plants that grow locally.
- (2) A manager who contravenes sub-regulation (1) commits an offence and is liable on summary conviction to a fine of not more than one thousand five hundred penalty units or a term of imprisonment of not more than five years and is in addition liable for the cost of the restoration of the land.

### Surface mining

#### **Regulation 82—Design of surface mine**

- (1) The manager of a mine shall prepare and implement a mine design that:
- (a) is based on sound geotechnical engineering practices which
    - (i) takes into account the geology of the mine;
    - (ii) assesses the ground stability of the active and proposed workings of the mine;
    - (iii) takes into account previous occurrences of ground instability;
    - (iv) outlines the geometry of existing and proposed excavations;
    - (v) includes a slope stability monitoring program; and
    - (vi) outlines the methods to be used to control water from the strata or from surrounding bodies of water;
  - (b) considers, as far as is reasonably practicable, the health and safety of workers;
  - (c) is prepared under the direction of a qualified person;
  - (d) consists of drawings, plans, specifications and procedures
  - (e) includes a blasting design, where required; and
  - (f) takes into account other important factors with regard to the mine design.
- (2) The manager of a mine shall ensure that a mine design is assessed and updated under the direction of a qualified person
- (a) annually; and
  - (b) before any modification is made to the mine design that might significantly affect the ground stability of the mine.

### **Regulation 83—Geotechnical considerations for surface operations**

- (1) The manager of a mine shall ensure that geotechnical aspects are adequately considered in relation to the operation and abandonment of mine operations or works.
- (2) The manager of a surface operation shall in relation to ground control ensure among others that
  - (a) adequate consideration is given to
    - (i) local geological structures and their influence on wall stability; and
    - (ii) the shear strength of the rock mass and its geological structure;
  - (b) a proper analysis is carried out of rain water inflow, surface drainage patterns, groundwater regime and mine de-watering procedures and their influence on wall stability over time;
  - (c) where necessary, appropriate designs of rock reinforcement are applied and used, and the quality of installation is verified;
  - (d) analysis is carried out of open pit wall stability for the projected geometry of the pit;
  - (e) appropriate drilling and blasting procedures are used to develop final walls; and
  - (f) appropriate methods of open pit wall monitoring are used over a period of time to determine wall stability conditions.
- (3) The manager of a mine shall ensure that appropriate precautions are taken and safe working procedures are developed, documented and followed where open pits are excavated through abandoned underground workings, or in close proximity to current underground workings.

### **Regulation 84—Design of haulage roads**

- (1) The manager of a mine shall ensure that the design and construction which include the width, gradient, camber and radius of curvature of bends of each road and other vehicle operating area at the mine
  - (a) are of a nature and in a condition that enable the safe operation of mobile equipment authorised to travel on the road or in the area; and
  - (b) take into account the size, speed, loads and operating characteristics of the equipment to be used, and the pit conditions including the effects of weather, on the road or in the area.
- (2) The manager of a mine shall ensure that each road and other vehicle operating area at the mine are maintained in manner that enables the safe operation of mobile equipment authorised to travel on the road or in the area.
- (3) The manager of a mine shall erect signs and install other devices or means that are necessary to control the speed and movement of vehicles using roads in the mine.
- (4) The manager of a mine shall ensure that haulage roads at an open pit mine are designed, constructed and maintained to provide
  - (a) a travel width:

(i) that is at least two and half times the width of the widest haulage vehicle used on the road where dual lane traffic exists; or

(ii) at least twice the width of the widest haulage vehicle used on the road where single lane traffic exists; and

(b) a surface and slope that reduce, as far as is reasonably practicable, the danger of vehicles slipping or skidding.

(5) The manager of a mine shall, where there is a drop-off greater in three metres from a haulage road at the mine, ensure that

(a) on haulage roads a berm of at least seventy-five percent of the height of the largest tyre on any vehicle used on the road is constructed and maintained along the edge of the road;

(b) at intersections, there is a berm with a height of at least fifty percent of the height of the largest tyre for a distance of twenty metres starting from the intersection; and

(c) an opening in a berm for the purpose of drainage does not exceed one metre in width.

(6) The manager of a mine in which the circumstances described subregulation (7) exist, shall

(a) where reasonably practicable, provide emergency runaway lanes or retardation barriers that are

(i) placed at suitable locations; and

(ii) capable of bringing a runaway vehicle to a controlled stop; and

(b) maintain and clearly mark the emergency runaway lanes or retardation barriers.

(7) Subregulation (6) applies where

(a) the grade of the haulage road exceeds ten percent; and

(b) a sharp bend in the haulage road creates a risk to the operator of a vehicle falling off that road; or

(c) the Chief Inspector of Mines directs that the manager complies with subregulation (6).

#### **Regulation 85—Safe means of access to be provided and maintained at surface workings**

The manager of a mine shall provide and maintain a safe means of access to each place at a surface working at which a worker in the mine requires access to work.

#### **Regulation 86—Boundary approach limit**

(1) In this regulation, “boundary approach limit” means the minimum distance that an excavation in an open pit mine may approach a boundary between two adjoining mining leases.

(2) The boundary approach limit shall not be less than fifteen metres.

(3) Where workings on adjoining mining leases approach each, the managers of the mines shall jointly determine the method of mining to be used in the area adjacent to the boundary approach limit to protect the health and safety of workers.

(4) In the case of unconsolidated materials, sloughing within the [sic] shall be left to form a natural slope and shall not be removed for any reason.

#### **Regulation 87—Mine boundaries**

The manager of a mine shall ensure that

(a) where planned or existing excavation, waste dump, ore stockpile, water or tailings impoundment or other activity or construction presents or is likely to present a hazard to a person on an adjacent mine or on any land adjacent to the boundary of the mine,

(i) the hazards are identified and the associated risks are assessed; and

(ii) consideration is given to what preventive or remedial measures can be taken to remove the hazards or guard against those risks; and

(b) excavations are not undertaken at a distance of less than thirty metres to the boundaries of other land holdings, which are owned by persons other than the holder of the mining lease; and

(c) sufficient space is left to install protection against inadvertent access by persons after the mine is abandoned.

#### **Regulation 88—Benches**

(1) The manager of a mine shall, where falling material may endanger a worker as a result of the height of a working face or the nature of the material being worked, ensure that the mine is provided with benches at suitable levels.

(2) In providing a bench under sub-regulation (1) the manager of the mine shall ensure that the maximum bench height is twenty metres and the minimum bench width is five metres.

#### **Regulation 89—Maximum working face height**

A manager shall ensure that in the mine, the height of a working face unless otherwise permitted by the Chief Inspector of Mines does not exceed the maximum height of the loading equipment used.

#### **Regulation 90—Precautions in working at the edge of faces and benches**

(1) A manager shall ensure that in the mine,

(a) loose material is scaled or trimmed from the edge of an open pit or a quarry where a worker is required or permitted to be present;

(b) except for berms, equipment, unconsolidated material, rocks and construction materials are kept at least two metres from the edge of the open pit or quarry;

(c) the slope of any pile of unconsolidated material adjacent to the edge of open pit or quarry is at an angle not steeper than the least of

(i) one horizontal to one vertical; and

(ii) the natural angle of repose

(d) a vehicle is not operated or located, and a heavy load is not located near the edge of an open pit mine so as to affect the stability of the walls of the open pit mine.

(2) A manager shall ensure that in the mine

(a) where necessary, appropriate methods and equipment are used to scale down bench faces above the benches on which a person is required to work;

(b) where a bench is or a series of benches are left un-worked in a mining operation,

(i) the height of the bench faces and the width of the benches are of a nature that enables the localised failures of the benches to be contained as far as is practicable in order to avoid a hazard to a person who works deeper in the pit; and

(ii) equipment is available to a person at the benches to enable that person to make the area safe;

(c) where the vertical height of the face exceeds three metres and explosives are used, bench drilling is carried out from the top of the bench;

(d) a face is not drilled or otherwise worked in a manner which will create an overhang of the face, and if unconsolidated rock is mined the face and sides are battered to prevent a collapse;

(e) a face is not undercut by the excavation of a slot at the toe or in any other part of the face;

(f) where a person on foot is required to work at the toe of a face or on the face itself, the face is scaled of loose rock which could fall on that person; and

(g) trees at or near the face or sides of the open pit working, quarry, trench or other similar working is cleared back to a sufficient distance to avoid danger from falls.

(3) Any drilling or firing of toe required in subregulation (2) (a) shall only be carried out on the express authority of the manager of the mine.

(4) Sub-regulation (2) (e) does not prevent a tunnel or an adit being driven into the face.

(5) This regulation does not apply to a mine where the rock is mined or sluiced by jets of water or like material.

#### **Regulation 91—Slope of open pits in unconsolidated material**

The manager of a surface mine shall ensure that where earth, clay, sand, gravel or any other unconsolidated materials is being removed from the mine by means of powered equipment:

(a) the working face is sloped at the angle of repose; or

(b) the vertical height of the working face is not more than one and a half metres above the maximum reach of the equipment.

#### **Regulation 92—Precautions to be taken against loose rock in open pits**

The manager of a surface mine shall ensure that



(a) in the mine, work is not carried out until a supervisor examines the face for any potential hazard to the health and safety of a person working in that part of the mine

(i) near a working face following a blast; or

(ii) near a face on which mining operations have discontinued for a period of more than seven days; and

(b) where the mine is worked in benches, loose rock on berms or benches are not permitted to accumulate so as to endanger a worker on a lower bench.

#### **Regulation 93—Life line for workers barring loose rock in a surface mine**

The manager of a surface mine shall provide a person employed in the mine to bar loose rock, or scale or clean a face of the mine or quarry with a life line and that person shall wear the life line whilst carrying out the work.

#### **Regulation 94—Manager responsible to avoid danger from falls**

(1) A manager shall ensure that operations in the mine are carried out in a manner that avoids danger from falls.

(2) A manager shall ensure that measures which include the provision of

(a) fences, signs, barricades and bund walls are taken to minimise, as far as is practicable, the risk of persons falling into a shaft, pit, quarry face, trench or other excavation in the mine; and

(b) fences, barricades, scaffolding, safety restraints or fall arrest equipment to reduce, as far as is practicable, the risk of falling to a person who works at a height of more than two and a half metres.

#### **Regulation 95—Fall arrest equipment**

A manager shall ensure that where there is a risk of injury to a person in the mine as a result of that person falling, and that risk cannot otherwise be eliminated, suitable fall arrest equipment is provided at the mine and that the equipment is

(a) maintained, serviced, and,

(b) where appropriate, manned by a competent person in accordance with good industry practice and the manufacturer's recommendations.

#### **Regulation 96—Lighting**

(1) A manager shall ensure that adequate stationary lights are provided at night in places on the surface of the mine where work is being carried out.

(2) A person shall not enter an un-illuminated part of a mine unless

(a) the person is in a vehicle that is illuminated; or

(b) the person or another person accompanying the person carries a light that is adequate to ensure safety.

(3) The manager of a mine shall ensure that

(a) safe driving zones on roads in surface mining operations are marked by lights or other marker guides which are clearly visible at night;

(b) that the edges of benches and banks and similar precipitous places near roads used for surface mining operations are clearly illuminated or effectively marked; and

(c) adequate lights are located at every place in the mine where vehicles regularly dump material over the edge of an embankment that is more than three metres high.

### **Regulation 97—Operation of vehicles**

(1) A manager shall ensure that

(a) only competent drivers are permitted to operate a vehicle in the mine; and

(b) the driver of a vehicle in the mine,

(i) does not exceed a speed that is reasonable and safe;

(ii) operates the vehicle in a safe manner.

(2) A person driving a vehicle in a mine shall

(a) ensure that the vehicle does not exceed a speed that is reasonable and safe; and

(b) operate the vehicle in a safe manner.

### **Regulation 98—Prohibition of riding on vehicles without passenger seat**

(1) A person shall not, in a mine, ride on an earthmoving vehicle which includes a dumper, a bulldozer or a scraper if that vehicle does not have a passenger seat and if that person is not the driver of the vehicle.

(2) Sub-regulation(1) does not apply to a person who stands in the cab of an excavator which is being operated in a mine if there is no danger of that person falling off from the excavator.

### **Regulation 99—Traffic control plan**

(1) A manager shall, develop and implement a written traffic control plan for the mine, to protect persons working in the mine from danger.

(2) The traffic control plan shall in relation to the mine specify, as appropriate

(a) the maximum allowable speed of any vehicle in use;

(b) the maximum operating grades of vehicles;

(c) the location and type of control signs;

- (d) the route to be taken by vehicles and units of powered mobile equipment;
  - (e) the priority to be established for classes of vehicles;
  - (f) the location and type of barriers, restricted areas or safety stations;
  - (g) the procedure to be used in case of an emergency; and
  - (h) the duties of workers and the manager
- (3) The manager of a mine shall ensure that
- (a) workers in the mine are trained in the traffic control plan, and
  - (b) the traffic control plan is made readily available for reference by workers.

#### **Regulation 100—General requirements for conveyor belts**

A manager shall ensure that a worker

- (a) does not ride on a conveyor belt; or
  - (b) except as provided in sub-regulation (2), does not cross a conveyor belt that has not been locked out.
- (2) A worker may cross a conveyor belt on a walkway that
- (a) has guardrails; and
  - (b) is at least six hundred millimetres wide.
- (3) Where a worker is at risk of being caught in a pinch point at the head, tail, drive or tension pulleys of a conveyor belt in a mine, the manager of the mine shall ensure that
- (a) the pinch point is protected by an effective safeguard; and
  - (b) the safeguard extends at least one metre beyond the pinch point.
- (4) A manager shall ensure that a conveyor belt in the mine is equipped with a belt-slip detection device designed to stop the drive motor in the case of belt blockage or belt slippage.
- (5) Where an elevated conveyor belt in the mine crosses over a place where a person is likely to pass or work, the manager of the mine shall ensure that suitable precautions are taken to prevent materials on the conveyor belt from falling on that person.

#### **Regulation 101—Start-up warning device for conveyor belts required**

- (1) A manager shall ensure that a conveyor belt in the mine is equipped with an effective start-up warning device.
- (2) The start-up warning device shall be:
  - (a) visible and audible,
  - (b) be located at suitable intervals along the conveyor belt; and

(c) have a mechanism that provides a ten-second delay between the sounding of the warning and the start-up of the conveyor belt.

#### **Regulation 102—Pull cords required**

A manager shall ensure that

(a) a conveyor belt in the mine is equipped with controls that can be reset manually after an emergency stop;

(b) every accessible section of a belt conveyor is equipped with a pull cord or other device approved by the Chief Inspector of Mines that is capable of stopping the conveyor in the case of an emergency; and

(c) the pull cord

(i) reaches from the head pulley to the tail pulley; and

(ii) is located to maximize its effective use.

#### **Regulation 103—Motor vehicle brakes**

(1) The manager of a mine shall ensure that

(a) a motor vehicle which is not equipped and maintained with suitable brakes capable of effectively stopping and holding that vehicle when fully loaded under any conditions of operation and when driven in accordance with the manager's instructions is not used in the mine;

(b) the following types of equipment in the mine are equipped with independent braking systems for use in an emergency in the event of failure of the primary braking system:

(i) wheeled earth moving machinery; and

(ii) any other vehicle to which it is practicable to fit an independent braking system.

(c) each motor vehicle at the mine is maintained in good order and condition; and

(d) a competent person tests and, where necessary, adjusts the brakes of each motor vehicle to ensure that they operate effectively:

(2) A person responsible for a motor vehicle in a mine shall not leave that motor vehicle unattended unless the motor vehicle is parked in a safe manner with the controls in the correct position for parking and the parking brakes are fully applied.

(3) A person working in a mine who finds a defect in a vehicle used in the mine which can make the operation of that motor vehicle in the mine unsafe shall immediately report the defect to the manager or the manager's representative.

#### **Regulation 104—Motor vehicle safety equipment**

(1) A manager shall ensure that a motor vehicle used in the mine is equipped with

(a) effective headlights, tail lights and turn indicators;

- (b) an effective audible warning signal, which can be sounded when the vehicle is about to be moved where clear vision immediately in front of and behind the vehicle is not available to the driver;
  - (c) with an audible warning device which automatically activates when the vehicle is in reverse gear;
  - (d) adequate seating for the driver and any passengers;
  - (e) a flashing light on the cab of light servicing vehicles and vehicles used to transport personnel; and
  - (f) seat belts and seat belt anchorage points that comply with applicable standards that are prescribed under these Regulations, or as otherwise directed by the Chief Inspector.
- (2) A person driving a motor vehicle in a mine shall sound the warning signal referred to in sub-regulation (1) (b) when the vehicle is about to be moved and the person does not have clear vision immediately in front of and behind the vehicle.
- (3) A person driving a motor vehicle used in a mine shall ensure that a flashing light on the vehicle is operated when the vehicle is being used in an area designated by the manager.
- (4) The manager shall not allow a motor vehicle to be driven in the mine, and a person shall not drive a motor vehicle in a mine, unless the brakes, steering, warning signal and lights of the motor vehicle are good working condition.

#### **Regulation 105—Loading precautions**

- (1) The driver of a haul truck in a mine shall not enter or leave that driver's cab while the truck is being loaded.
- (2) The driver of a shovel or loader in a mine shall not permit the bucket of the shovel or loader to be traversed over by the driver's cab of a truck or other motor vehicle during loading operations.
- (3) A person in a mine shall keep clear of the area between the loading unit and the face, and the area traversed by the loading bucket during loading operations.

#### **Regulation 106—Interpretation regarding dumps and stockpiles**

In these Regulations, in relation to dumps and stockpiles,

- (a) “mine waste rock dump” means a pile or heap of waste rock at a mine that
- (i) exceeds three metres in height; and
  - (ii) is intended for reclamation; and
- (b) “stockpile” means a pile or heap of ore or waste at a mine that
- (i) exceeds three metres in height;
  - (ii) is of temporary nature; and
  - (iii) is not intended for reclamation.

### **Regulation 107—Mine waste rock dump**

(1) A manager shall in relation to the mine prepare a written dump plan and submit that plan to the Inspectorate Division for approval and shall not commence construction of a dump, road or a ramp that is part of the dumping operation until approval for the dumping plan has been obtained.

(2) The Manager shall

(a) not construct, enlarge, or otherwise make a structural alteration to a waste dump in an area covered by a mineral right without the approval of the Chief Inspector; and

(b) seek approval to construct or otherwise make a structural alteration to a waste dump under sub-regulation (1) and for that purpose shall

(i) lodge with the Chief Inspector plans and specifications showing the details prescribed for the construction or enlargement or other alteration proposed to be carried out; and

(ii) satisfy the Chief Inspector that proper measures have been and will be taken to ensure the health and safety of the persons undertaking the construction, enlargement or alteration and of persons who will work, or otherwise be present, in the vicinity of the waste dump.

(3) A plan and specifications required to be lodged with the Chief Inspector under sub-regulation (2) shall be drawn to scale with the essential measurements plotted on the plans, and shall contain:

(a) a contour plan and cross-section of the locality and site of the waste dump;

(b) details and nature of the materials proposed to be used in the construction of the waste dump or as applicable, the enlarged or altered area of the waste dump;

(c) the types of waste to be deposited in the waste dump; and

(d) the measures to be employed to ensure that

(i) the waste deposited in the waste dump does not, as far as practicable, give rise to risks to health and safety;

(ii) the waste deposited in the waste dump and noxious effluents from the waste do not escape or leak from the area of the waste dump;

(iii) acid rock drainage from sulphide waste material does not occur; and

(iv) noxious or offensive odours, detectable by persons who reside in the vicinity of the waste dump, are not emitted from the waste dump.

(4) The manager shall not use a waste dump which is constructed, enlarged or altered under this regulation until the waste dump has been inspected and certified, to the extent practicable, as not posing a danger to health and safety.

(5) The manager shall ensure that a

(a) dump plan developed under sub-regulation (1) is made readily available to workers at the mine, and

(b) dump is designed by a competent person.

### **Regulation 108—Discontinuance of waste dumps**

- (1) A mineral right holder of a mine to which a waste dump relates who intends to discontinue the use of that waste dump, shall before the discontinuance take the measures prescribed by the Regulations.
- (2) Within fourteen days after discontinuance of use of a waste dump, the holder of the mineral right of the mine to which the waste dump relates shall, give to the Chief Inspector a written notice of the discontinuance as set in Form Seventeen of the First Schedule.
- (3) A mineral right holder of a mine which has a waste dump who intends to permanently close down the waste dump shall within ninety days before the date on which the waste dump is intended to be closed down, lodge with the Chief Inspector, plans and specifications setting out the procedures to be followed in treating the waste dump to ensure that as far as is practicable, the waste dump after it has been closed down, does not pose a danger to any person or property.

### **Regulation 109—Temporary stockpiles**

- (1) Where material is to be stored in a stockpile in a mine, the manager of the mine shall
  - (a) develop a work plan for the operation of the stockpile to ensure the health and safety of workers who work on or near the stockpile;
  - (b) make a copy of the work plan readily available to workers at the stockpile; and
  - (c) ensure that persons working on or near the stockpile comply with the work plan.
- (2) A work plan for the operation of a stockpile shall be in writing and shall include provisions for
  - (a) supervision of the operation;
  - (b) training of workers;
  - (c) any necessary limits on the use of equipment on or near the stockpile;
  - (d) control of:
    - (i) the formation of dangerous slopes;
    - (ii) the undermining of the stockpile; and
    - (iii) draw points and dumping operations.

### **Regulation 110—Dumping precautions**

- (1) A manager of a mine shall ensure that the design, layout, construction and maintenance of a dump or stockpile takes into account the following factors to minimise any potential for instability of the dump or stockpile
  - (a) the nature of the material dumped;
  - (b) the size and weight of the equipment used;

(c) the site conditions, including stability of the area on which the dump is built;

(d) the drainage conditions; and

(e) the weather conditions.

(2) The manager of a mine shall ensure that rock or other material is not dumped from a motor vehicle over a bank or into a bin at the mine unless there is

(a) an effective back stop including berms, bumper blocks, safety hooks or similar means as required to prevent over-travel and overturning at the tipping and dumping locations, or

(b) a person suitably stationed to guide and direct the driver of the motor vehicle to a safe dumping position.

(3) The manager of a mine shall ensure that, at any time that dumping is carried out in the mine,

(a) marker guides or other effective signs are placed to indicate to the driver of the motor vehicle the limit of safe approach to the tipping area;

(b) the dumping site and the areas adjacent to that site are illuminated by stationary lights so placed as to give effective illumination to the working area and to the edge of the dump area.

(4) The manager of a mine shall ensure that a system is established in the mine that ensures the stability of a dumping site if rock or other material is to be dumped from a motor vehicle over a bank or bench.

#### **Regulation 111—Dumping at stockpiles and feed bins**

The manager of a mine shall

(a) ensure that in the mine,

(i) dumping is not carried out over the edge of a stockpile where loading out from the base of the stockpile is done unless the load out area is at a sufficient distance and will not undermine the dumping location;

(ii) where dumping is done, the tipping area at the feed bin has a suitable width, clearance and headroom to accommodate the equipment using the facilities; and

(iii) during the process of dumping, grizzlies, grates and similar stationary sizing devices at a feed bin are securely mounted and anchored;

(b) provide a person required to work in the mine on a grizzly while breaking rocks with a securely anchored safety belt and that person shall wear that belt;

(c) ensure that in the mine feed bins, storage bins, chutes, grizzlies and other installations at stockpiles are designed and installed in a manner that ensures that the persons operating them are not in a hazardous position whilst at work; and

(d) work to free a blockage in a chute is only carried out by a competent person who fully understands the hazards involved.



### **Regulation 112—Stockpile safety precautions**

(1) A person shall not walk or climb on top of an active surge stockpile of broken rock which is fed from above and from which the rock is withdrawn through an extraction system below unless

(a) that person has been instructed to do so by the manager of the mine or that manager's representative;

(b) the feed to and from the stockpile has been stopped;

(c) it has been established that the extraction system below is not hung up;

(d) that person uses an appropriate fall arrest protection system; and

(e) that person is assisted by another person stationed at a safe vantage point above that person.

(2) A person shall not use earthmoving equipment on a surge stockpile unless the manager of the mine or that manager's representative has authorised the person to do so.

(3) The manager of the mine or that manager's representative shall not give authorisation under sub-regulation (2), unless that manager or that manager's representative is satisfied that it is safe to use the earthmoving equipment on the stockpile.

(4) The manager of a mine shall ensure that, if material is removed from the base of a stockpile, adequate precautions are taken to ensure that a slump of the stockpile will not occur to endanger a person working on, or in the vicinity of, the stockpile.

(5) Subject to sub-regulation (6), the manager of a mine shall ensure that any tunnel under a surge stockpile of broken rock or other unconsolidated material has two entrances which are kept clear of obstructions at all times.

(6) A tunnel under a surge stockpile may have a single entrance, if there is only one extraction point located at the blind end of the tunnel.

### **Regulation 113—Precautions for works at water ponds**

(1) Where a person working adjacent to a place where there is water is likely in the course of employment to fall into the water and possibly drown,

(a) that person shall wear a life jacket; and

(b) the manager of the mine shall provide suitable rescue equipment which shall be kept in good order and ready for immediate use in the resolve of any person in danger of drowning.

(2) Where the elevation of the ground immediately adjacent to a place referred to in sub-regulation (1), is at least one metre above the level of the water or where a floating stage is used on the water or there is a structure immediately adjacent to the water,

(a) adequate fencing or similar safeguards shall be provided and maintained to a height of not more than one and half metres at the edges of the ground or structure immediately adjacent to the water; and

(b) in the case of a floating stage, the fencing shall cover the full perimeter of the floating stage.

(3) Despite sub-regulation (2), the fencing may be temporarily removed for the purposes of maintenance, repair or movement of material.

#### **Regulation 114—Sluicing operations**

In a mine where rock is being mined or sluiced by jets of water or similar material,

(a) a person shall not approach

(i) the top of an operation face within a distance equal to twice the height of that face; or

(ii) the toe of that face within a distance determined by the manager of the mine; and

(b) the manager of the mine shall ensure that signs are erected to mark the limits referred to in paragraph (a).

#### **Regulation 115—Restriction of access**

A manager shall implement measures that are necessary to prevent inadvertent access to a surface mining operation by a person who is not employed at the mine or is not authorised to enter the mine.

#### **Regulation 116—Sand pits**

(1) Unless the face of a sandpit in a mine stands at an angle that approximates the natural angle of repose of the sand, the manager of the mine shall determine the maximum height of a working face after considering the nature of the material mined, the method of mining and the equipment being used, so that safe working conditions are maintained.

(2) The manager of a mine shall ensure that each bench has separate loading arrangements and is of sufficient length and breadth to provide safe working conditions for the vehicles and equipment to be used on that bench.

(3) The manager of a mine shall ensure that a working face is advanced over as great a length as is practicable and, at the end of each day of work, is sloped to prevent a slump of sand.

(4) For the purposes of this regulation the walls of a sand pit excavation are working faces.

#### Dredges

#### **Regulation 117—Dredges**

(1) A manager shall ensure that a dredge used at the mine is equipped with

(a) adequate and suitable fire-fighting equipment;

(b) adequate guard rails to prevent any worker from falling over the edge into the water;

(c) a suitable gangplank for exit to a permanent walkway;

(d) a ladder on each side of the dredge that extends from the deck to the water level for rescue purposes;

(e) an adequate means of exit from the engine room and control cabin; and

(f) an effective means of communicating with workers on the dredge.

(2) Where a worker is required or permitted to be on a dredge in the mine that is not connected to the shore by a walkway, the manager shall ensure that at least two suitable boats, one based at the dredge and the other based at the shore, are available for immediate use and that a suitable landing bay is also provided at the shore.

(3) The manager shall ensure that in the mine,

(a) flammable materials, other than lubricant and fuel necessary for twenty-four hours of operation, are not stored on a dredge; and

(b) every dredge is equipped with a lightning protection system.

#### **Regulation 118—Dredges to be approved**

The holder of a mining lease shall not use a dredge in a mining operation unless the use of the dredge has been approved in writing by the Chief Inspector of Mines.

#### **Regulation 119—Approval for use of a dredge**

(1) An application to the Chief Inspector of Mines for approval to use a dredge in a mining operation shall be in writing as set out in Form Eighteen in the First Schedule and shall include

(a) plans showing the location of the dredging operation together with the general layout of the dredging proposal;

(b) design and construction details of the dredge including

(i) structural details;

(ii) the means to be used to manoeuvre the dredge and move the dredge from place to place in the dredging operation;

(iii) the means to be used to break out and raise the product of the dredging operations; and

(iv) the maximum depth below the surface of the water at which dredging operations are to be carried out;

(c) design details of mooring or anchoring apparatus to be used in carrying out the dredging operation;

(d) details of the loads used in design, stability and buoyancy calculations;

(e) details of any ballast requirements or limitations including any restrictions on the storage of free liquid, and the maximum and minimum draught of the dredge;

(f) details of the means of access from the bank to the dredge;

(g) the report of a qualified naval architect confirming the buoyancy and stability of the dredge under all operating conditions;

(h) the results of buoyancy and stability tests; and

(i) details of any approvals obtained under other laws.

(2) The Chief Inspector of Mines may request the holder of the mining lease in relation to which the dredging is to be carried out to provide additional information to that provided under sub-regulation (1).

(3) The holder of a mining lease shall ensure that a request made under sub-regulation (2) is complied with within fourteen days from the date of the request.

(4) Where the holder of a mining lease applies to use a dredge in accordance with this regulation, the Chief Inspector of Mines may approve the use of the dredge in the mining operation as set out in Form Nineteen in the First Schedule.

#### **Regulation 120—Approval of repairs or modifications**

(1) A manager shall, before any repairs, modifications or alterations that may affect the strength, buoyancy or stability of a dredge used in the mine are carried out,

(a) apply in writing to the Chief Inspector of Mines for approval as set out in Form Twenty in the First Schedule to carry out that work;

(b) submit to the Chief Inspector of Mines plans, specifications, drawings and design calculations which indicate the nature and extent of that work; and

(c) obtain the approval of the Chief Inspector of Mines.

(2) The Chief Inspector of Mines may request the manager to provide additional information to that provided under sub-regulation (1).

(3) The manager shall ensure that a request made under subregulation (2) is complied with within thirty days from the date of the request.

(4) Where the manager applies in accordance with this regulation, the Chief Inspector of Mines may approve the repairs, modifications or alterations on the dredge to be carried out as set out in Form Twenty-One in the First Schedule.

#### **Regulation 121—Dredging operations and maintenance**

A manager shall ensure that in the mine,

(a) the hull of a dredge is maintained in a sound and watertight condition;

(b) buoyancy compartments and ballast compartments are maintained in a manner that ensures the stability of the dredge;

(c) freeboard is maintained to suit the prevailing operating conditions;

(d) suitable means are provided to prevent persons from falling overboard;

- (e) warning systems or devices are provided to give a warning when the machinery is about to be started;
- (f) automatic electrical or mechanical devices are provided that immediately stop any apparatus from breaking out or raising material from the working face in the event of an overload which might affect the stability of the dredge;
- (g) devices are provided that indicate variations in the list and the fore and aft trim of the dredge;
- (h) the stability and structure of the dredge are maintained when materials, plant, equipment or other loads are transferred to it or removed from it;
- (i) sounding probes are provided for hourly or regular soundings and the readings are recorded in a book that is kept for the purpose by the inspector;
- (j) hatchways and other deck openings are fitted with watertight seals, or safeguarded by coamings not less than four hundred millimetres in height unless otherwise approved by the Chief Inspector;
- (k) the man-holes connecting the compartments are closed at all times, unless they are ready for inspection;
- (l) each member of the crew wears a lifejacket when employed in a boat work or out-boat work;
- (m) a dredge at the mine which works close to a bank is provided with a gangway of not less than three-quarters of a metre wide and long enough to reach from the dredge to the bank;
- (n) the following safety appliances are provided and maintained in good working order in connection with every dredge used,
  - (i) a lifebuoy, a light line and a boat hook near the bow of the dredge;
  - (ii) a lifebuoy, a light line and a boat hook near the stern of the dredge;
  - (iii) a boat containing a light line and a boat hook; and
  - (iv) a looped wire line securely fastened about one hundred and fifty millimetres above the water line around the outside of a pontoon; and
- (o) where a dredge at the mine is not entirely covered, the sides of the uncovered portion of the hull are fitted with:
  - (i) stanchions which are not more than two and a half metres apart; and
  - (ii) two substantial hand rails or tightly sprung wires or chains, the lower rail, wire or chain not being more than two hundred and fifty millimetres above the deck.
- (2) A gangway provided under sub-regulation (1) (m) shall have a substantial hand rail at each side and be secured to the deck of the dredge.
- (3) The fittings referred to in this regulation may be
  - (a) movable; and
  - (b) moved when taking material on board the dredge but shall be kept in position at all other times.

### **Regulation 122—Life saving equipment**

(1) A manager shall ensure that

(a) a dredge used for the purpose of the mine is equipped with life saving equipment that is necessary to preserve the lives and enable the rescue of persons who may fall overboard the dredge;

(b) the life saving equipment referred to in subregulation (1) is

(i) adequate in number;

(ii) kept in a conspicuous place that is easily accessible; and

(iii) immediately repaired or replaced when it is damaged or lost.

(2) A person shall not interfere with any life saving equipment provided on a dredge except

(a) for the purpose of saving lives;

(b) in the course of the conduct of a training exercise approved by the manager; or

(c) as otherwise authorised by the manager of the mine.

### **Regulation 123—Maximum number of persons permitted on a dredge**

The Chief Inspector shall approve the maximum number of persons that may be carried on a dredge at any time, after taking into consideration the number and capacity of life saving equipment and the manager shall post on the dredge notice of the life saving equipment and the approval.

### **Regulation 124—Testing and recording of test required on a dredge**

(1) The following tests in relation to a dredge shall be made each day by a competent person appointed by the manager and the result of the test shall immediately be recorded in a book to be kept on the dredge

(a) sounding of hull compartments, freeboard at the bow and stern both port and starboard, and in respect of bucket dredges, the dredging depth or angle of ladder unless the dredging depth is recorded automatically, and

(b) test of the automatic alarm bell provided in compliance with directives issued by the Chief Inspector.

(2) The record book required to be kept under sub-regulation (1) shall be available at all reasonable times for examination by the Chief Inspector.

### **Regulation 125—Head lines, side lines and mooring lines**

A manager shall ensure that,

(a) necessary warning notices are posted in conspicuous places to warn persons of danger from headlines, side lines, mooring lines and other drive lines; and

(b) each anchor for a head line, side line, mooring lines and other drive lines is of adequate strength.

### **Regulation 126—Illumination of dredges**

(1) A manager shall ensure that each workplace used in a dredging operation is adequately illuminated at night.

(2) A person shall not enter at night, a part of the mine where a dredging operation is being carried out if that part is not illuminated unless that person or another person accompanying that person carries a light adequate to ensure the person's safety.

### Underground mine design and mine entries

#### **Regulation 127—Design of underground mine**

A manager shall develop, maintain and implement a mine design that

- (a) is based on sound geotechnical engineering practices;
  - (b) takes into consideration, so far as is reasonably practicable, the health and safety of workers with the objective to reduce risks created by dust, blasting fumes, temperature, gases, and other risks specific to underground mines;
  - (c) is prepared under the direction of a qualified person;
  - (d) consists of drawings, plans, specifications and procedures to be used in the construction and operation of the mine;
  - (e) takes into account the geology of the mine;
  - (f) assesses the ground stability of the active and proposed workings of the mine;
  - (g) takes into account previous occurrences of ground instability;
  - (h) outlines the location and geometry of existing and propose excavations;
  - (i) includes blasting design for development and production workings;
  - (j) outlines the methods to be used for mine water drainage;
  - (k) includes a ground stability monitoring program;
  - (l) includes a ventilation plan;
  - (m) ensures that each person working underground can reach a surface within thirty minutes walking distance from any place in the mine at any time; and
  - (n) takes into account other aspects which are important for a safe mine operation.
- (2) The manager shall ensure that a mine design is assessed and updated under the direction of a qualified person
- (a) annually; and
  - (b) before any alteration is made to the mine that might significantly affect the ground stability.

### **Regulation 128—Two outlets from mine to surface necessary**

Subject to regulations 129, 131 and 134 a manager shall not employ a person in an underground mine that does not provide

- (a) at least two outlets, including shafts, adits, or tunnels that
  - (i) at any time afford communication with every vein, lode, reef, ore body or mineral deposit being worked and a separate means of ingress and egress from the mine; and
  - (ii) are not at any point less than ten metres distant from each other;
- (b) a cage or conveyance which is approved by an inspector and which is operated in accordance with guidelines established and maintained at every vertical shaft mentioned in paragraph (a) where the shaft has a depth exceeding ten metres;
- (c) in the case of a shaft, adit, tunnel or outlet to the surface which does not exceed ten metres in depth and which is at an inclination of more than twenty degrees to the horizontal and which is not provided with a cage or conveyance mentioned paragraph (b), a ladder or stairway and maintained in the prescribed manner; and
- (d) separate means of ingress and egress for any chamber
  - (i) below ground containing machinery, transformers, electrical switch gear; or
  - (ii) where batteries are charged.

### **Regulation 129—Exemption regarding outlets of underground mines**

(1) Regulation 128 does not apply to a newly opened mine which employs not more than thirty persons underground at any one time for the purpose of

- (a) making a communication between two or more shafts, adits, tunnels or outlets in any new developing mine; or
- (b) the interruption of ingress or egress or of communication within the mine workings as a result of an accident or dangerous occurrence.

(2) The Chief Inspector may by order in writing, and on the conditions that are specified in the order, exempt a mine which was operating before the commencement of these Regulations from the provisions of regulation 128.

### **Regulation 130—Removal of pillars**

(1) A pillar shall not be removed if the removal will cause interruption of the communications in the workings between two or more shafts, adits, tunnels or outlets.

(2) Pillars required for the support of and between shafts, adits, tunnels or outlets shall not be removed so as to cause an interruption in the case of the shafts, adits, tunnels or outlets but where



a mine is to be closed or abandoned the Chief Inspector may approve the removal of pillars under conditions that the Chief Inspector considers appropriate.

**Regulation 131—Two independent outlets from the mine to surface required**

- (1) Despite regulation 128 of these Regulations, a mine shall have
  - (a) at least two shafts or outlets to the surface, and
  - (b) a communication channel of not less than one metre wide and two metres high.
- (2) The shafts or outlets shall provide separate means of ingress or egress to the persons in the mine, but it is not necessary for shafts or outlets to be situated on the same mine.
- (3) The shafts or outlets required under sub-regulation (1) shall not
  - (a) lead to the surface in the same shaft shed, and
  - (b) at any point be nearer to one another than ten metres.

**Regulation 132—Responsibility for maintenance of outlets in different mines**

- (1) In any case in which two outlets or part of them do not belong to the same mine, the managers of the respective mines shall be responsible for keeping the outlet or the part of the outlet in their respective mines in a proper state of repair, and
  - (a) where there is an obstruction in any of the outlets; or
  - (b) anything occurs in the mine to jeopardise the safety of the outlet, the fact shall be immediately reported to the manager of the other mine.
- (2) Where the two outlets or part of the two outlets referred to in sub-regulation (1) is situated in an abandoned mine the manager of the working mine is responsible for the proper maintenance and repair of the outlet in the abandoned mine.

**Regulation 133—Access to underground workings**

A person shall not, except otherwise authorised by the manager, enter or leave an underground working except by means of the ingress or egress specially provided for the purpose.

**Regulation 134—Exemptions regarding provisions for two outlets**

The requirement in regulations 131 and 132 for two outlets does not apply to a Mine

- (a) in which one of the shafts or outlets has temporarily become unavailable to the persons working in the mine if
  - (i) an effort is being made by the manager to repair the damage, and

(ii) the manager has informed the Chief Inspector of the unavailability of the shaft and of the repair work which is being carried out on it;

(b) in which not more than ten persons are at any one time employed underground, or in any working connected with a shaft or outlet which is not connected to another shaft or outlet,

(c) in which more than ten but not more than thirty persons are at any one time employed underground, or in any working connected with a shaft or outlet, if the mine is exempted in writing by the Chief Inspector; and

(d) whether that mine is at the prospecting or producing stage except that in a mine to which regulations 131 and 132 do not apply working shall not be carried out at a distance beyond two hundred metres from the last through ventilation connection unless the mine is exempted in writing by the Chief Inspector under conditions that the Chief Inspector may impose.

### **Regulation 135—Shaft landings**

A manager of a mine shall provide shaft landings in the mine with

(a) two stopping barriers capable of stopping a runaway locomotive from entering the shaft;

(b) a lighting system;

(c) telephone communication to the banksman; and

(d) a separate waiting bay for mine workers waiting to be raised to the surface, where material transportation is carried out in the respective shaft landing.

### Ladder-ways and travelling-ways

#### **Regulation 136—Headgear to be equipped with ladder-ways and fenced platforms**

(1) A manager of a mine shall provide

(a) each headgear in the mine with a properly constructed ladder-way up to the top of the frame, and

(b) other places on or within the headgear at which persons are regularly required to work with fenced platforms.

(2) The manager shall ensure that in inclined shafts in the mine, the ladder-way on the headgear is erected on the inclined slope leading to the entrance of the shaft, and is railed off from the hauling ways.

#### **Regulation 137—Ladder-ways to be provided in all shafts**

(1) A manager of a mine shall provide, in each shaft in the mine which has an inclination,

(a) of more than thirty degrees from the horizontal, a ladderway which is positioned in a manner that protects it from damage as a result of blasting; and

(b) of more than forty degrees from the horizontal, a ladder-way which is connected to the bottom of the shaft by chains or chain ladders.

(2) The Chief Inspector may under special circumstances, and subject to specified conditions grant exemptions in writing from the provisions of sub-regulation (1).

(3) The manager of a mine shall ensure that in the mine

(a) vertical and steeply inclined workings in use are connected with the levels by means of proper ladder ways and separated from the rock passes;

(b) in underhand stopes in which the angle of the face of the stope exceeds forty degrees from the horizontal, chains or chain ladders are provided for use of persons employed on the face of the stopes; and

(c) ladder ways are kept accessible at all times and covered during shaft repairs but not locked up.

(4) Sub-regulation (3) (a) does not apply to underhand stopes which are worked in a manner that ensures that the face of the stope does not exceed an angle of forty degrees from the horizontal.

#### **Regulation 138—Platforms to be provided in ladder-ways**

A manager of a mine shall ensure that in the mine,

(a) main travelling ways which exceed twenty metres in depth and which are at an inclination of more than seventy degrees from the horizontal, platforms or rest places are provided at distances of not more than ten metres apart;

(b) a ladder is not erected at a greater inclination than eighty degrees from the horizontal, and is placed in a manner that enables it to cover the manholes of the rest places;

(c) a ladder is positioned vertically only under exceptional circumstances and with the written consent of the inspector;

(d) a ladder which is used for any purpose connected with the mine is sufficiently strong, and securely fastened to the timbering or sides of the shaft or working, and maintained in proper repair;

(e) the space between the rungs of each ladder does not exceed thirty centimetres;

(f) the rungs of each ladder is

(i) not less than a distance of twelve centimetres from the wall against which the ladder is placed; and

(ii) kept clear of everything which might interfere with the foothold;

(g) a ladder is not positioned in travelling ways in an overhanging position; and

(h) a ladder projects at least one metre above the entrance of the shaft, winze, raise or other excavation and above the landing place in which the ladder is installed except where strong hand rails are fixed at the entrance or landing place.

**Regulation 139—Travelling ways in steeply inclined shafts to be bratticed off**

(1) A manager of a mine shall ensure that

(a) in a vertical or steeply inclined shaft or winze in the mine the compartment used as a foot travelling way is securely bratticed off from the other compartments to the satisfaction of the inspector;

(b) in other shafts or winzes, the foot travelling way is adequately railed off so as to prevent any person inadvertently entering the winding compartment; and

(2) The Chief Inspector may grant exemption from sub-regulation (1) in existing shafts and winzes for a period of time and under conditions that the Chief Inspector may specify.

**Regulation 140—Special travelling ways to be used**

(1) A person in a mine shall use only the travelling way set apart for the purpose of ascending or descending from one point of the mine to the other.

(2) This regulation does not apply to a person lawfully engaged in an inspection or effecting repairs in the mine.

**Regulation 141—Carrying of tools or loose materials on ladder ways prohibited**

(1) A person shall not carry or cause another person to carry a drill or another tool or loose material which may interfere with that person's or that other person's safe passage in a ladder way except as is necessary for carrying out repairs.

(2) A person who carries an object in a ladder way shall ensure that the object is carried in a manner that ensures that it cannot be reasonably expected to fall down the ladder way.

**Regulation 142—Crossing winding compartments**

The manager of a mine shall make provision for workmen in the mine to cross without entering or crossing a winding compartment, and securely fence off passage used by workmen from moving parts of machines at each shaft station where it is necessary for workmen to pass from one side to the other.

**Regulation 143—When crossing permitted**

A person shall not enter or cross a winding compartment of a shaft or of a headgear in a mine, except for the purpose of entering, leaving or having access to the cage, skip or other conveyance or for the purpose of conducting an examination, effecting repairs or doing other necessary work in the compartment.

### **Regulation 144—Protection for sinkers and travelling in sinking shafts**

(1) A person shall not work at the bottom of a shaft in the course of sinking unless that person is protected by an adequate cover extending over the whole area of the shaft but with adequate space left for the ladder way and for the passage of any sinking cage, skip, bucket or other means of conveyance.

(2) The cover shall

(a) be at least one and a half metres below the lowest bin pass, or

(b) where there are no bins below the lowest level, the cover shall be situated not more than twenty-five metres from the bottom of the shaft in vertical and steeply inclined shafts and no more than thirty metres from the bottom of the shafts in other shafts,

but where substantial covers have been erected below the lowest bin pass or level temporary covers may be erected below the substantial covers within the maximum distances from the bottom of the shaft as provided in this sub-regulation.

(3) A manager of a mine shall ensure that except

(a) where a person is in a cage or is otherwise permitted by these Regulations, or

(b) for the purpose of carrying out repairs or in the case of pressing necessity, a person does not ascend or descend in shaft or winze which has an inclination of thirty-five degree or more from the horizontal and which does not have a ladder way.

(4) Subject to sub-regulation (3), a person employed in sinking a shaft in a mine may ascend from, or descend into the shaft for a distance not exceeding sixty metres by means of the bucket used for hoisting material from the shaft.

(5) Despite sub-regulation (4), where material is hoisted direct to the surface, a person may, with the written consent of an inspector and on conditions specified by the inspector, ascend or descend for any distance in a shaft if a “monkey” or other approved safety device is used on the bucket.

### Underground haulage

#### **Regulation 145—Refuge holes and minimum clearance locomotive transport**

A manager of a mine shall ensure that at a place underground in the mine where there is a locomotive pulling or pushing a train of vehicles,

(a) there is a horizontal clearance of at least sixty centimeters between the widest part of each vehicle of the train and the side of that place,

(b) refuge holes are provided at intervals not exceeding thirty metres to give protection to a person who has to pass through the place,

(c) the clearance is free from loose material and broken rock; and

(d) adequate clearance is provided for the safety of a person riding in or on any of the vehicles.

### **Regulation 146—Minimum clearance trackless transport**

A manager of a mine shall ensure that

- (a) a self-propelled trackless vehicle is not permitted to move in any place underground in the mine, unless adequate clearance is provided for the safety of the driver of the vehicle and there are suitable refuge holes provided to give protection to a person who may have to pass through the place whilst the vehicle is in motion;
- (b) the clearance required under this regulation is sufficient in width and height for the passage of the vehicle and the driver of the vehicle and is free from any broken rock or loose material;
- (c) the intervals between the refuge holes required under this regulation are of a nature that affords maximum protection for a person who may have to pass along the place whilst the vehicle is in motion in that place; and
- (d) where refuge holes are required to be provided in any length of any ramp or road the refuge holes in the mine are placed on one and the same side, and in the case of a curve as far as is practicable on the outside of the curve.

### **Regulation 147—Underground mine roads**

A manager of a mine shall ensure that an underground road in the mine is designed and built in a manner that ensures that

- (a) the gradient and radius of any part of the road can be negotiated safely by a vehicle;
- (b) where persons are permitted to work or travel on the road and the road is used by vehicles and mobile equipment which are likely to endanger the safety of those persons, refuge bays of appropriate dimensions are provided at intervals not exceeding thirty metres to provide shelter for those persons;
- (c) the road is, where appropriate, provided with
  - (i) a walkway, the whole of which is visible from both ends, or
  - (ii) adequate means of regulating the movement of vehicles; and
- (d) signs that are necessary to control the speed and movement of vehicles are erected at suitable places along the road.

### **Regulation 148—Refuge holes**

(1) A manager of a mine shall ensure that in the mine,

- (a) the minimum dimensions of a refuge hole are
  - (i) one metre in width;
  - (ii) two metres in depth; and
  - (iii) two metres in height; and
- (b) a refuge hole is clearly marked and, kept clean and free from any obstruction.

### **Regulation 149—Movement of persons prohibited**

Where the conditions specified in regulations 145 and 146 do not exist in a mine or cannot apply, a person in that mine shall not move on foot whilst a vehicle is in motion in that mine.

### **Regulation 150—Trackless vehicles and trolley lines**

(1) A manager of a mine shall ensure that a self-propelled trackless vehicle is not used in any place underground in the mine or at any place on the surface of the mine unless adequate precautions are taken to ensure that any live trolley line conductor near to the Vehicle is

(a) isolated during the period in which the vehicle passes or moves under that live trolley line conductor, or

(b) suitably protected to the extent that

(i) a person normally seated in the accommodation in the vehicle required to be provided in accordance with regulation 167; or

(ii) a part of the vehicle

cannot come into contact with the live trolley line conductor.

(2) A person carrying any material or tool whilst travelling in a vehicle or when walking under a live trolley line conductor in a mine shall take all reasonable precautions to ensure that the material or tool does not inadvertently come into contact with that conductor.

### **Regulation 151—Trackless vehicle requirements**

(1) A manager of a mine shall ensure that a self-propelled trackless vehicle in the mine is provided with

(a) an efficient braking system which has two means of operation one of which can be applied by direct mechanical action; or

(b) two efficient braking systems each of which has a separate means of operation and the failure of one of which does not affect the effectiveness of the other; the same brake shoes operating within or on the braking surface of the vehicle may be used when operating either of the two braking systems; and

(c) means of giving adequate audible warning;

(d) a safe operating position for the driver;

(e) adequate lighting which in the case of a vehicle which

(i) moves regularly in a forward direction consists of two white headlights affixed to the front capable of illuminating the way ahead for a distance of at least sixty metres and a suitable reflector and red light affixed to the rear in a manner that makes it visible directly from the rear; or

(ii) may move regularly in either direction consists of two white headlights fixed to the front and two to the rear of the unit, each set capable of illuminating the way ahead for at least sixty metres, and a suitable reflector and red light affixed to the front and rear in such manner as to be clearly visible.

(2) The manager of a mine shall ensure that in the mine

(a) the outlet of exhaust gases of trackless vehicles is arranged in a manner that ensures that exhaust gases do not endanger persons and that no dust is raised;

(b) tyres used on trackless vehicles are in good working conditions;

(c) each self-propelled trackless vehicle has a record book where tests and examinations are recorded;

(d) refuelling of a trackless vehicle is done only if the engine is shut off; and

(e) a trackless vehicle is parked

(i) on level ground;

(ii) with all controls in the neutral or parking position;

(iii) with the parking brake engaged and chocks placed under the wheels, where required; and

(iv) with the master switch key removed and stored in a safe place.

(3) A person operating a trackless vehicle in a mine shall ensure that the vehicle does not pass by another person unless that other person is in a refuge hole or a safe area similar to a refuge hole and where there is no refuge hole or safe area, the vehicle waits with the parking brake engaged until that other person has walked past the vehicle.

#### **Regulation 152—Requirements for scoops**

The manager of a mine shall ensure that in the mine,

(a) where loading operation in a stope or a drive requires the use of a scoop under a roof without any support, the scoop which is used for the operation shall be remote controlled;

(b) a person in charge of a scoop may only dump material into a chute or a pass if that person provides stop-blocks for the scoop;

(c) a scoop is not operated in the articulated area if the frame pin is not in place;

(d) a loaded scoop moves only with the bucket in the tramming position; and

(e) the bucket of a scoop is lowered when the scoop is being parked.

#### **Regulation 153—Requirements for drill jumbos**

An operator of a drill jumbo shall before driving the jumbo into drilling position, ensure that the ground is stable.



### **Regulation 154—Requirements for locomotives**

A manager of a mine shall ensure that a locomotive which is used in the mine is provided with

(a) an efficient braking system which has two means of operation one of which can be applied by direct mechanical action;

(b) a means of giving adequate audible warning;

(c) a safe operating position for the driver; and

(d) adequate lighting to be used when the locomotive is operating underground or when it is operating on the surface between the hours of sunset and sunrise and the lighting, where the locomotive is

(i) pulling a train of vehicles, consists of a white light affixed to the front of the locomotive capable of illuminating the way ahead for a distance of at least sixty metres and a red light affixed to the last vehicle in a manner that makes that light clearly visible from the rear; or

(ii) pushing a train of vehicles, consists of a white light affixed to the front of the leading vehicle of the train capable of illuminating the way ahead for a distance of at least sixty metres and a red light affixed to the locomotive in a manner that makes that light clearly visible from the rear; or

(iii) moving without a train of vehicles, consists of a white light affixed to the leading end of the locomotive capable of illuminating the way ahead for a distance of at least sixty metres and a red light affixed to the other end of the locomotive in a manner that makes that light clearly visible from the rear.

### **Regulation 155—Duties of a driver**

(1) The driver in charge of a trackless self-propelled vehicle or locomotive shall ensure that

(a) the brakes of the vehicle are in good working order;

(b) the warning signals and lights of the vehicle or locomotive are in good working order and in the event of the signals and lights not being in good working order or not being affixed ensure that the vehicle is not moved to any place other than the nearest place where repairs can be effected; and

(c) the vehicle is not moved when the brakes are not in a good working order.

(2) Despite sub-regulation (1) (c), where one of the braking systems specified in regulation 151 or 154 is out of order, the driver may move the vehicle to the nearest place where the defective system can be repaired, but where both the systems are defective then the vehicle or locomotive may be towed to the workshop by another vehicle or locomotive connected to the defective vehicle or locomotive by means of a rigid towing bar.

(3) The driver in charge of a trackless self-propelled vehicle or locomotive shall ensure that the vehicle or locomotive

(a) does not exceed a speed that is reasonable and safe; and

(b) is operated in a safe manner.

### **Regulation 156—Fire extinguishers**

- (1) A manager of a mine shall ensure that a self-propelled vehicle including a motor car used underground in the mine is equipped with a portable fire extinguisher which is readily accessible to the driver when the vehicle is in use.
- (2) The driver of a self-propelled vehicle shall ensure that the portable extinguisher is affixed to the vehicle and where the extinguisher is not affixed, the driver shall immediately notify the driver's immediate superior.
- (3) The manager of the mine shall ensure that a self-propelled vehicle including a motor vehicle used underground in the mine, is in addition to a portable fire extinguisher, equipped with a fixed fire extinguishing system which is activated automatically or by pushing a button and is capable of extinguishing a fire in any inflammable part of the vehicle.

### **Regulation 157—Speed limit, speed indicator and operating hour meter**

A manager of a mine shall ensure that

- (a) the speed limit of a vehicle used underground in the mine does not exceed thirty-five kilometres per hour;
- (b) where the speed of any self-propelled vehicle is for any reason limited, an operative speed indicator is provided, maintained and used unless the speed of the vehicle is governed mechanically in a manner that prevents the speed limit from being exceeded; and
- (c) a self-propelled vehicle is equipped with an operating hour meter.

### **Regulation 158—Vehicle not to be left unattended**

- (1) A driver of a self-propelled vehicle shall not leave the vehicle unattended at a place other than where the vehicle is normally kept when the vehicle is not in use unless the controls of the vehicle are placed in the park position and the parking brake, if provided, is engaged and, the wheels or tracks are blocked.
- (2) The driver of a self-propelled diesel vehicle shall not keep the engine running when the unit is stationary except
  - (a) during brief halts or where that is necessary for normal operation; or
  - (b) while the engine is being tested.

### **Regulation 159—Unobstructed view for driver or guidance by authorised person**

- (1) A manager of a mine shall take reasonable measures to ensure that each vehicle in use in the mine has a reasonably unobstructed view in the direction of travel and the manager and that where these measures do not exist the driver is guided by suitable signals given only by persons authorized to give these signals.

(2) A driver shall not move that driver's vehicle when that driver's view is obstructed until the driver receives a suitable signal as required accordance with sub-regulation (1).

(3) A person authorised in accordance with sub-regulation (1) shall not give any signal until that authorised person is satisfied that it is safe for the vehicle to move.

#### **Regulation 160—Underground vehicles and accessories to be built of non-flammable materials**

A manager of a mine shall ensure that a vehicle used underground in the mine and each of its accessories are, as is practicable, made of non-flammable material which will minimise the risk of fire.

#### **Regulation 161—Regular technical inspection of underground vehicles**

(1) A manager of a mine shall ensure that in the mine

(a) there is in force, a scheme for the systematic inspection, examination and testing of each self-propelled vehicle at least once in a year vehicle;

(b) a thorough examination of each new vehicle is carried out at least once in a year; and

(c) the examination is documented in the record book of the vehicle which is the subject of the examination.

(2) The self-propelled vehicles which are subject to inspection in accordance with sub-regulation (1) are those vehicles which are

(a) owned by the mine;

(b) not owned by the mine but operated by the mine; and

(c) not owned by the mine but operated by a contractor.

(3) The inspections, examinations and tests referred to in this regulation shall be of a nature that ensures that the external parts of the engine or motor, the condition and operations of controls, safety device and signal arrangements are in proper working order.

#### **Regulation 162—Underground workshops for vehicles**

A manager of a mine shall ensure that in a mine, a self-propelled vehicle which is required to be examined in accordance with regulation 61 is examined in a suitable workshop which

(a) is constructed of non flammable material;

(b) is provided with not less than two means of egress;

(c) is ventilated by a current of air sufficient to dilute and render harmless the exhaust gases emitted while the engine is being run at that workshop;

(d) has a concrete floor;

(e) is equipped with suitable

- (i) means for inspecting the vehicle from below;
- (ii) lighting for use when persons are working in that workshop and the bulbs or tubes used in that workshop are adequately protected;
- (f) is provided with suitable equipment for extinguishing fires; and
- (h) has fire doors in accordance with regulation 195.

### **Regulation 163—Only diesel engines permitted underground**

A manager of a mine shall ensure that except with the written permission of the Chief Inspector an internal combustion engine other than a diesel engine is not used underground in the mine.

### **Regulation 164—Diesel engine requirements**

A manager of a mine shall ensure that in the mine,

- (a) each self-propelled diesel unit underground is constructed and maintained in a manner that ensures that
  - (i) air entering the engine is cleaned;
  - (ii) exhaust gases are cooled and diluted;
  - (iii) emission of flames and sparks is prevented; and
  - (iv) leakage of oil is avoided;
- (b) exhaust gases of diesel engines do not exceed
  - (i) 500 ppm (carbon monoxide (CO));
  - (ii) 750 ppm nitrous fumes (NO<sub>x</sub>); and
  - (iii) 75 ppm nitrogen dioxide (NO<sub>2</sub>); and
- (c) the ventilation requirement for each section where a diesel engine is operated is an air flow of not less than 0.0.6m<sup>3</sup> per second per installed kW.

### **Regulation 165—Rules of discipline to be observed regarding vehicles**

A person shall not whilst that person is in the mine,

- (a) wilfully damage or interfere with or instruct another person to damage or interfere with a vehicle used in a mine;
- (b) neglect to inspect or maintain a vehicle which that person is required to inspect or maintain under these Regulations;
- (c) get on or off a vehicle whilst the vehicle is in motion except where that person is directly engaged in shunting operations on the surface;

(d) ride in or on any vehicle unless that person is authorised to ride in or on that vehicle and then only in a position that does not endanger that person or any other person;

(e) drive or operate a vehicle unless that person is competent to drive or operate that vehicle and has been authorised in writing to drive or operate the vehicle; and

(f) negligently or wilfully drive or operate or cause to be driven or operated a vehicle in a manner that endangers the safety of the mine or the safety or health of any person in the mine.

#### **Regulation 166—Haulage in inclines**

A manager of a mine shall

(a) ensure that where a truck or car on an inclined track in the mine is attached to a rope or chain, adequate safety device are provided to prevent any danger that might be posed by the truck or car if it slips from the track; and

(b) where the traction in the mine is operated by gravity and the inclined plane exceeds fifty metres in length, provide an efficient means of communicating distinct signals from the inclined plane and the stopping places connected with the inclined plane.

#### **Regulation 167—Riding on vehicles**

A person shall not ride in or on any vehicle in a mine unless suitable and adequate accommodation is provided for that purpose.

#### **Regulation 168—Signalling for traction other than a locomotive**

Where traction in a mine is operated by machinery other than a locomotive, the manager of the mine shall provide a signalling apparatus by which distinct signals can be given to the engine driver from locations along the haulage way.

#### **Regulation 169—Material exceeding length of truck**

A manager of a mine shall ensure that in the mine,

(a) a truck which contains timber or other material that exceeds the length of the truck is not coupled next to the locomotive or to a truck in which a person is being conveyed; and

(b) a truck which contains timber or other material being transported in the mine by a locomotive is not pushed but pulled.

#### **Regulation 170—Arrangement of control levers**

A manager of a mine shall ensure that the control lever of a storage battery or a trolley locomotive in use in the mine is arranged in a manner that the lever cannot accidentally be moved when power is on.

**Regulation 171—Defective and non-maintained vehicles not to be used**

A manager of a mine shall ensure that a self-propelled vehicle is not used in the mine if that vehicle

- (a) has a defect likely to affect its safe operation; or
- (b) is not maintained in proper working order or replenished with necessary and consumable stores.

**Regulation 172—Storage of fuel oil in locked enclosure**

A manager of a mine shall ensure that fuel oil kept mine is stored below ground if that fuel oil is kept in a locked enclosure.

**Regulation 173—Filling stations underground**

(1) A manager of a mine shall ensure that in the mine

- (a) each filling station underground
    - (i) is built according to an approved construction;
    - (ii) is operated according to safe work procedures established by the manager and approved by the Chief Inspector of Mines;
    - (iii) is constructed of non-flammable material;
    - (iv) is provided with not less than two means of egress;
    - (v) is ventilated by a current of air sufficient to dilute and render harmless all gases emitted during filling operations;
    - (vi) has a concrete floor; and
    - (vii) is provided with a fire extinguishing system and portable fire extinguishers;
  - (b) fuel oil is only stored underground in a filling station if that oil is stored in a suitable container or tank that does not leak;
  - (c) where oil is spilt in a place within the mine, the spilt is oil cleaned up immediately with dry sand or another suitable material, and if in the process of cleaning the oil, any material is contaminated, that material is placed in a suitable container and removed from the mine; and
  - (d) shall ensure that oil spillage on a diesel engine or diesel unit is immediately cleaned.
- (2) A person who is underground in a mine shall not take any fuel oil from a container at a filling station while a diesel engine is running within five meters of that container.
- (3) A person in a mine shall not light or use a naked light in a filling station or oil storage compartment and the manager of the mine shall post and maintain suitable notices to this effect at the entrances of that station or compartment.
- (4) The manager of a mine shall ensure that

(a) a filling station underground in the mine is equipped with suitable electric lighting and the bulbs or tubes used in the lighting are adequately protected;

(b) a container or tank used for transporting fuel oil underground in the mine is suitably constructed leak proof and provided with positive locking device; and

(c) fuel oil is not delivered underground in the mine through a pipe in a downcast shaft or transported underground in an intake airway, except where that means of delivery or transportation does not constitute a hazard.

(5) The Chief Inspector of Mines may give approval for the means of delivery or transportation referred to in sub-regulation (4)(b).

(6) Despite sub-regulation (4), subject to conditions determined by the Chief Inspector, oil may be transferred in a pipe from

(a) an underground container to an oil mine storage compartment;

(b) an oil storage compartment to a filling station; and

(c) an oil filling station to a trackless vehicle,

if the length of the pipe by which the transfer is done does not exceed thirty metres.

(7) The manager of the mine shall ensure that fuel oil used underground in the mine if it is diesel or used for diesel engines

(a) has a flash point of not less than 60°C; and

(b) has a sulphur content which is not greater than 0.5% by weight; and

(c) does not contain an additive except with the written permission of the Chief Inspector.

(8) The manager of the mine shall ensure that the suitable container or tank referred to in sub-regulation (4) is kept in or adjacent to a filling station in an enclosed storage compartment which

(a) if located beyond ten metres from the entrance of the filling station, is provided with two means of egress;

(b) is constructed of non-flammable materials;

(c) is situated in a well ventilated place, the return air of which is satisfactorily diluted; and

(d) has walls constructed in a manner that

(i) makes the walls form a liquid-tight joint with the floor, and

(ii) openings through the walls are not at a height which is less than that necessary to form a reservoir of greater capacity than the maximum volume of diesel fuel contained in that compartment;

(9) Despite sub-regulation (8), where the container or tank is buried in concrete, or material having no cavities within or adjacent to the filling station, the manager of the mine shall provide the container with a breather pipe leading from the top of that container or tank to a through airway.

(10) The manager of the mine shall ensure that in the mine

(a) a fuel oil storage compartment is provided with a suitable mechanism for extinguishing fires and that the mechanism is positioned immediately adjacent to the air inlet end of that storage compartment;

(b) a fire extinguishing mechanism kept under paragraph (a) is of a type that triggers automatically when fire or smoke is present and is capable of foaming to completely cover the storage tank or the filling Station within seconds of a fire or smoke;

(c) in addition to the type of fire extinguisher required by paragraph(b), a manually operated fire extinguisher is provided; and

(d) a transfer or filling operation that involves fuel oil does not take place within three metres of a live trolley line conductor.

#### Underground general

#### **Regulation 174—Securing of workings with unsafe ground conditions.**

(1) A manager of a mine shall ensure that in the mine

(a) where the natural strata are not safe, each working or pumping shaft, and travelling way, airway or working place is

(i) securely supported,

(ii) filled,

(iii) walled up or otherwise made secure, and

(iv) kept in a safe condition as long as that shaft is in actual use;

(b) that a person who is not appointed for the purpose of inspecting or repairing, does not travel or work in that shaft or underground working until that shaft or underground working is made secure; and

(c) ground which is known to be dangerous is not left unattended unless that ground is properly secured, made safe or fenced off.

(2) The manager of the mine shall without limiting paragraph (a) of sub-regulation (1), ensure that in the mine sufficient reserve of suitable ground support material is provided conveniently for supporting the excavation.

#### **Regulation 175—Reporting danger and books for complaint**

(1) Where a person working in a mine has a reason to believe that any part of the mine in which that person is working or through which that person has to travel to get to that person's work place, is in a dangerous condition, that person shall immediately inform the Mine captain or Shift Boss who shall immediately take steps to remove the danger.

(2) The manager of the mine shall keep a book at the mine office in which a person may enter a complaint with regard to the safe working of the mine and the manager shall make the book available for inspection at any time by an inspector.



### **Regulation 176—Safety pillars between adjoining properties**

- (1) A manager of a mine shall ensure that safety pillars are erected and maintained on the inside of the boundary lines of the mine at a distance of not less than ten metres in width measured at right angles from the boundary line.
- (2) The Chief Inspector shall on the joint application of the owners of adjoining mines, give permission to either party to weaken, cut through or work on their respective pillars between the mines under conditions that the Chief Inspector may specify in writing.
- (3) The Chief Inspector may in the absence of a joint application, given written permission for the partial working, weakening or cutting through of the pillars under conditions that the Chief Inspector may specify in writing.
- (4) The application and permission under this regulation shall be as set in Form Twenty-Two in the First Schedule.

### **Regulation 177—Material used for underground backfill**

A manager of a mine shall ensure that in the mine

- (a) tailings used for filling of worked out areas underground and the liquids draining from the tailing do not contain a higher cyanide content than the limit values established by the Environmental Protection Agency;
- (b) debris, refuse or other similar material which is likely to be detrimental to the health of persons working in the mine is not sent down the mine for the purpose of filling up excavation or for any other purpose.

### **Regulation 178—Stagnant water to be drained off**

A manager of a mine shall ensure that in the mine

- (a) stagnant water is not allowed to remain on the floors levels which are in use; and
- (b) where an accumulation of stagnant water is being drained from a winze, every practicable precaution is taken to prevent the pollution of the mine atmosphere by noxious gases given off by the water.

### Ventilation and dust prevention

#### **Regulation 179—Quality of underground mine air**

- (1) A manager of a mine shall in relation to the mine, take steps that are necessary to ensure that adequate ventilation is supplied to places where persons are travelling or working underground.
- (2) For the purposes of sub-regulation (1), ventilation is adequate if it
  - (a) ensures that the amount of oxygen in the general body of the air is not less than nineteen per cent by volume;

(b) ensures that the amount of carbon dioxide, carbon monoxide, nitrous fumes, sulphur dioxide and hydrogen sulphide in the general body of the air do not exceed in the case of

- (i) carbon dioxide (CO<sub>2</sub>) 0.5% by volume or 5000ppm;
- (ii) carbon monoxide (CO) 0.005% by volume or 50ppm;
- (iii) Sulphur dioxide (SO<sub>2</sub>) 0.0005% by volume or 5ppm;
- (iv) nitrogen dioxide (NO<sub>2</sub>) 0.0003% by volume or 3ppm;
- (v) nitrous fumes (NO<sub>x</sub>) 0.0025% by volume or 25ppm; and
- (vi) methane (NH<sub>4</sub>) 1% by volume or 10,000ppm;

(c) dilutes or removes any other toxic gas or fume so that the amount of the gas or fume in the general body of the air conforms to the requirements that may be prescribed, by the Chief Inspector;

(d) dilutes or removes harmful dust so that the amount of the dust in the general body of the air conforms to the requirement prescribed by the Chief Inspector;

(e) maintains working conditions free from

- (i) dangerous temperatures, and
- (ii) high relative humidity in the general body of the air;

(f) provides any diesel unit with not less than 0.06 cubic metres of air per second per kilowatt of the diesel unit for the purpose of diluting or removing toxic gas or fumes in the general body of the air at places where the diesel unit operates; and

(g) ensures that the quantity of pure air circulating around working places and stopes in the mine is not less than 0.05 cubic meters per second for each person underground.

(3) The manager of a mine shall ensure that the speed of air in the mine is

(a) not below

- (i) 0.2 m/s in roadways, and
- (ii) 0.1 m/s in large excavations, and

(b) does not exceed 6 m/s.

(4) The manager of a mine shall ensure that in the mine

(a) the quality of air is continuously monitored to enable the detection of carbon monoxide in main return airways, and

(b) the data relating to the monitoring is transmitted to the central control room at the surface.

(5) The Chief Inspector of Mines may issue guidelines on quality of air in a mine.

### **Regulation 180—Temperatures**

(1) A manager of a mine shall ensure that in the mine the wet bulb temperature at any working place or any travelling way does not exceed 32.5°C except

- (a) in the course of attempting to lower the temperature;
- (b) in the course of undertaking emergency response training or,
- (c) during an emergency.

(2) The manager of a mine shall provide longer breaks and a reduced working time for workmen in the mine if the wet bulb temperature in the mine exceeds 27°C.

### **Regulation 181—Person not allowed to stay in foul air**

(1) A person shall not enter, travel, work or remain or cause or permit another person under the authority of that person to enter, travel, work or remain in a place in the mine where it is known that

- (a) the requirements of regulation 179 are not being complied with; and
- (b) where that person or that other person is likely to be exposed to conditions arising from excessive amounts of toxic gas or fumes, dust or excessive temperatures.

(2) The manager of a mine shall ensure that only teams of the mine rescue brigade which are appropriately equipped are allowed to enter areas of foul air in the mine.

### **Regulation 182—Duty of manager to ensure acceptable mine air quality**

Where for any reason the ventilation required by regulation 179 ceases to be adequate, the manager of the mine shall ensure that

- (a) necessary steps are taken to ensure the safety and health of any person who may be endangered by that condition; and
- (b) adequate ventilation is restored as soon as practicable.

### **Regulation 183—Respirator and dust mask to be provided**

(1) A manager of a mine shall ensure that an effective respirator is provided to persons working in the mine who are likely to be exposed to fumes or dust, and those persons use the respirators where there are fumes or dust.

(2) The manager of the mine shall provide dust masks and ensure that the dust masks are used by persons working in areas of the mine where the dust content of the air is likely to exceed

- (a) 3 mg/m<sup>3</sup> of alveolar dust; or
- (b) 10 mg/m<sup>3</sup> of any dust.

#### **Regulation 184—Power of Chief Inspector to prescribe minimum mine air quality**

The Chief Inspector of Mines may, by notice in the Gazette, publication in at least two newspapers of nationwide circulation and by publication on the website of the Commission determine

(a) any gas or fume other than those already prescribed under sub-regulation (2) (b) of regulation 179 to be toxic and the maximum permissible amount of that gas or fume content that should be in the general body of the air in a mine; and

(b) the maximum permissible amount of any dust content that should be in the general body of the air in a mine.

#### **Regulation 185—Obligation of workmen to inform manager and duty of manager**

(1) Where a person working in a mine becomes aware of the fact that any other person is unknowingly exposed to conditions arising from excessive amounts of toxic gas or fumes, dust or harmful temperatures, that person shall take steps that are necessary to remove the other person from the exposure.

(2) A person who removes an exposed person under sub-regulation (1), shall immediately inform the manager of the mine of the circumstances of the exposure and the manager shall take further steps necessary to ensure the safety and health of each person who has been or may subsequently be exposed to the conditions specified in subregulation (1) and to rectify and prevent a recurrence of those conditions.

#### **Regulation 186—Control of underground mine ventilation system**

(1) The manager of an underground mine shall in relation to that mine ensure that at intervals not exceeding three months, a competent person makes determinations of

(a) the quantity, the quality and speed of air circulating in the mine;

(b) the temperature of air circulating in the mine as indicated by the wet and dry bulb thermometers in the mine; and

(c) the amount of dust present in the general body of the air in the mine as determined by a method approved in writing by the Chief Inspector.

(2) The determinations required in sub-regulation (1), shall be made at

(a) the collar of each downcast shaft;

(b) every main air intake underground;

(c) each main intake to every working section;

(d) each intake and face at every working place; and

(e) adjacent to every rock tipping and rock loading point.

### **Regulation 187—Ventilation of adjoining mines**

Where a ventilation of the underground workings of a mine depends on communication between that mine and an adjoining mine, the manager of either mine shall not, without the written consent of an Inspector and mutual agreement between the managers, obstruct or permit an obstruction to the ventilation in a manner that reduces the quantity of air circulating.

### **Regulation 188—Regular analysis of mine air samples**

A manager of a mine shall ensure that a competent person takes samples of the general body of the air in the mine where a diesel equipment operates in the mine to determine

- (a) the volume of air flow in that area of the mine;
- (b) at least once a month and immediately following repairs to the equipment which may affect the combustion characteristics of the equipment,
  - (i) the carbon monoxide (CO), and
  - (ii) nitrous fumes (NO<sub>x</sub>) contents of the undiluted exhaust discharge into the underground atmosphere;
- (c) at least once a month, at the request of the operator, the carbon monoxide (CO), nitrogen oxide (NO), nitrogen dioxide (NO<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) contents of the atmosphere at the operator's position; and
- (d) at least once every three months the content of other gases in the atmosphere at the operator's position.

### **Regulation 189—Inspectorate Division Diesel Log Book**

- (1) The results of the determination required in regulation 188 shall be entered in the Inspectorate Division Diesel Log Book and shall be signed by the official in charge of the Ventilation Department of the mine, and the Mine Captain in charge of the section of the mine.
- (2) The book shall be examined and countersigned by the manager or Underground Manager at least once a week, and shall be opened for inspection by an inspector.
- (3) The manager shall submit monthly dust and quarterly ventilation reports of the mine as set out in Form Twenty-Three in the First Schedule to the Chief Inspector.

### **Regulation 190—Adequate ventilation, a requirement for operation of diesel engine**

A manager of a mine shall ensure that every diesel unit underground in the mine is operated in a haulage way or working place only where adequate ventilation is maintained.

### **Regulation 191—Diesel engines not to be operated on failure of ventilation**

In the event of the failure of ventilation underground

- (a) the engine of each diesel unit in the haulage or working places affected by the failure shall be immediately stopped; and
- (b) the engine shall not be restarted until the ventilation has been restored and the conditions of the air corrected to be within the limits specified in regulation 179.

**Regulation 192—Operation of defective diesel engines prohibited**

A manager of a mine shall ensure that a self-propelled diesel unit is not operated underground in the mine if

- (a) the exhaust gases of the engine are found not to comply with the requirements of regulation 164; and
- (b) the engine has any defect which may cause the production of other gases harmful to persons.

**Regulation 193—Ventilation plans and records**

The manager of an underground mine shall keep and maintain accurate plans and records of the mechanical ventilation system in that mine showing

- (a) the location of ventilation fans;
- (b) the volumes of air in cubic metres per second handled by the ventilation fans;
- (c) the fan operating gauge pressure;
- (d) quantity and direction of flow of air in the ventilation circuit; and
- (e) the location of
  - (i) fire doors; and
  - (ii) ventilation doors, brattices, stoppings and regulators controlling the airflows.

**Regulation 194—Ventilation doors provisions**

- (1) A manager of a mine shall ensure that doors in the mine that assist or in any way affect ventilation in the mine are installed in a manner that makes them self closing.
- (2) A person who opens a door specified in sub-regulation (1) shall ensure that the door is closed immediately.
- (3) The manager of the mine shall ensure that each door, stopping, brattice or seal installed to maintain ventilation in the mine is of adequate strength and is properly maintained.

**Regulation 195—Fire doors provisions**

- (1) A manager of a mine shall ensure that each fire door in the mine, is

(a) designed and built in a manner that enables that door to be closed and opened from both sides; and

(b) of substantial and fire proof construction, easy to close and air tight.

(2) The manager shall ensure that the following areas in the mine are provided with fire doors that enable those areas to be sealed off in case of fire:

(a) the main section of an underground mine;

(b) a workshop of self-propelled vehicles; and

(c) a fuel station.

### **Regulation 196—Auxiliary ventilation provisions**

(1) The manager of an underground mine shall ensure that in the mine,

(a) subject to paragraph (b), a development or exploration work place is ventilated throughout by an auxiliary ventilation system for any distance in excess of ten metres from a mechanical mine ventilation system; and

(b) a continuous and adequate supply of fresh air is provided and used to dilute and remove contaminants in

(i) a production work place

(ii) a raise or winze, and

(iii) a cross-cut for any distance in excess of ten from the mechanical mine ventilation system.

(2) The fresh air supply prescribed in paragraph (b) of subregulation (1) shall be

(a) independent of the air coming from any drill or machine used;

(b) controlled only at the beginning of the raise, winze or sub-drift; and

(c) available when a blast is detonated.

(3) The manager of the mine shall ensure that in the mine

(a) an auxiliary fan is not installed or operated underground at any place unless the quantity of air reaching the auxiliary fan at all times is sufficient to ensure that any recirculation of air does not prejudice the supply of adequate ventilation; and

(b) the maximum distance between the end of the air duct and face is not more than thirty metres,

### **Regulation 197—Maximum length of auxiliary ventilation**

(1) A manager of a mine shall ensure that a working place in the mine is not extended to a distance of two hundred metres from the last through ventilation connection except by permission in writing of the Chief Inspector.

(2) The request for permission shall be made by application as set out in Form Twenty-Four in the First Schedule to the Chief Inspector and shall contain

- (a) a plan which shows the respective section of the mine and the proposed development;
- (b) details of the working place in the nature of dimensions, technology used, number of men at working place;
- (c) details of the ventilation grid in the respective sections; and
- (d) details of blasting operations.

**Regulation 198—Conditions for grant of permission for extension**

The permission required in regulation 197 shall only be granted if

- (a) a competent person not below the rank of blastman is responsible for the heading;
- (b) the Shift Boss gives an undertaking to inspect the heading as soon as practicable after entry of each shift and to document the inspection; and
- (c) a weekly ventilation survey is conducted and the readings obtained in the survey are recorded.

**Regulation 199—Underground areas not part of ventilation system**

(1) The manager of an underground mine shall ensure that in the mine an underground area of the mine which is not part of that mine's ventilation system

- (a) is effectively barricaded to prevent inadvertent entry;
- (b) has signs posted on it to warn persons that entry is prohibited; and
- (c) is subject to sub-regulation (3), examined by a competent person before any other person enters or is permitted to enter that area.

(2) The examination under sub-regulation (1) (c) shall determine

- (a) oxygen deficiency in the atmosphere;
- (b) the presence of a toxic gas, vapour, dust, mist, fume or; and
- (c) the existence of any other dangerous condition.

(3) A competent person shall only examine the underground area of a mine if that person is provided with a self contained breathing apparatus and instructions in writing that sets out

- (a) the hazard involved;
- (b) the use of testing equipment required;
- (c) the personal protective devices that that person is required to wear; and
- (d) any other precautions and procedures to be taken for that person's protection.



### **Regulation 200—Fire extinguishers to be approved by Chief Inspector of Mines**

A manager of a mine shall ensure that in the mine, a fire extinguisher which is capable of emitting or creating toxic gas or fumes is not used underground unless that extinguisher is approved under prescribed conditions in writing by the Chief Inspector.

### **Regulation 201—Blasting schedule**

(1) A manager of a mine shall

(a) prepare a schedule of specific times at which primary blasting in any part of the mine shall take place; and

(b) ensure that blasting in one part of the mine does not expose any person to danger in another part.

(2) The manager of the mine shall ensure that the schedule is not altered or amended in less than one hour or more than twenty-four hours before the commencement of the first shift to which the alteration or amendment applies.

(3) The manager of the mine may temporarily alter or amend the schedule in cases of emergency in order to prevent danger to life or property in the mine and the manager shall ensure that every official and person in charge or concerned is notified of the temporary alteration.

(4) The schedule required by sub-regulations (1) to (3) shall be

(a) prepared in a manner that ensures that a person in an area of the mine affected by the blast is not avoidably exposed to fumes, dust or flying debris originating from the blast; and

(b) posted in a conspicuous manner on the surface where it can conveniently be seen before the commencement of the shift by any official or person in charge of the mine.

(5) The blasting of misfired holes or hitches, or any blasting for the purpose of making a place safe in a mine, may be carried out at any time, but only with the express permission of the Shift Boss, or some other more senior official, if the Shift Boss or that other senior official is satisfied that no person will be exposed to any danger from the blast.

(6) A person shall not enter or cause or permit a subordinate to enter a place in the mine in which blasting has taken place and in which the air may have become dusty or contaminated with fumes from the blasting, until a competent person is satisfied that the polluted air has been removed and the environment is safe for breathing.

(7) In case of an emergency a person may enter the polluted place in the mine if authorised to do so by the Shift Boss in charge of the section, and if equipped with a reliable mask or breathing apparatus.

(8) If in the opinion of the inspector, any re-entry period is insufficient for the removal of dust and fumes which might occur in the mine, the inspector may in writing require the substitution for the re-entry period of a longer period.

### **Regulation 202—Vitiating air to be replaced after blasting**

(1) A person shall not enter or cause or permit another person to enter a place in a mine where blasting has occurred and where there is no through ventilating current until a quantity of fresh air which is not less than

(a) the volume of that place measured from the nearest point at which there is through ventilation, or

(b) a quantity prescribed by the inspector in writing for the particular working place,

is supplied to replace the air contaminated by dust or fumes caused by blasting.

(2) Except with the permission in writing of the ins[sic] person shall not stope or cause or permit another person to stope above a drive or level in a mine where there is no through ventilation connection from the stope to the drive or level above.

### **Regulation 203—Device for sweeping the face of development works**

(1) The manager of a mine shall ensure that primary blasting does not take place in any development work in the mine unless there has been installed a pipe of not less than twenty-five millimetres in diameter capable of discharging a mixture of air and water so as to effectively sweep the face of the development end.

(2) The air and water pipe combination required to be installed in the mine in accordance with sub-regulation (1), shall be installed at a distance of not more than ten metres from the face and shall be properly maintained.

### **Regulation 204—Obligatory activation of face sweeping device in development works**

(1) A blastman shall be responsible for blasting in a mine and shall, before detonating any explosive charge in any development work, turn on the mixture of air and water required to be provided in accordance with sub-regulation (1) of regulation 203.

(2) The blastman worker responsible for turning on the mixture shall ensure that the mixture of air and water continues to be discharged for a period of not less than thirty minutes.

### **Regulation 205—Control and removal of gas, fumes and dust**

The manager of a mine shall ensure that in the mine an effective means for the control, removal or disposal of gas, fume and dust within the limits prescribed under regulation 179 is provided and used at

(a) the main tipping station underground;

(b) the shaft loading boxes underground;

(c) the loading and discharging points in any conveyor or system of conveyors;

(d) each vibratory or mechanical rock feeder;

(e) each rock crushing machine, screen or plant; and

(f) each fixed machine used for the high speed milling and grinding of rock, rock drill bits or rock drill steel; and

(g) any sand blasting operation.

#### **Regulation 206—Dust collectors**

Where a filtration unit or plant has been installed for the collection of dust, the manager of the mine shall ensure the safety and health of any person in the vicinity of the unit or plant during the clearing of the unit or plant, and during the removal, transportation and disposal any dust collected.

#### **Regulation 207—Re-entry period**

A person shall not enter, or cause or permit a subordinate to enter, an area where blasting has taken place, until the expiry of the re-entry period and until the blastman is satisfied that the air is suitable for breathing.

#### **Regulation 208—Excavation through abandoned areas to be ventilated**

The manager of a mine shall ensure that a test pit or similar hole which is mined in excess of five metres in an abandoned area is provided with adequate ventilation before any person enters that pit or hole.

#### **Regulation 209—Water supply for dust suppression**

The manager of a mine shall provide an adequate supply of water which is clear and odourless at a pressure of not less than two hundred kilopascals at every point in the mine where water is required for dust prevention.

#### **Regulation 210—Removal or suppression of dust**

The manager of a mine shall

(a) vacuum;

(b) wet sweep;

(c) wet shovel; or

(d) by any other suitable means,

remove or suppress with a minimum of delay dust or other material which is likely to become a hazard when it becomes airborne.

### **Regulation 211—Use of wet swab**

(1) A person in an underground mine shall not use or cause or permit a subordinate to use any hand drill, moil or a similar tool except in sampling or cutting of hitches unless water is applied or a wet swab is used around the drill at the collar of the hole so as to reduce dust.

(2) Except where the nature of the ground is likely to make wetting dangerous,

(a) a person shall not commence or continue to drill any hole underground in a mine or cause or permit the commencement or continuation of drilling unless the floor, roof, sides, other surfaces, and broken rock of the working place, have been thoroughly wetted and kept wet, to a distance of at least ten metres;

(b) a person shall not, in an underground working of a mine,

(i) move a broken rock or ground that is likely to generate dust, or

(ii) cause or allow broken rock or ground to be moved if the rock or ground is in a dusty condition

unless the broken rock or ground and the floor, roof, sides, packs and other surfaces of the working place are effectively wetted to a distance of at least ten metres in either direction from the working place so as to prevent the escape of dust into the air during the removal; and

(c) a person who is underground in a mine shall not perform or cause or permit to be performed work of any kind that creates dust unless

(i) the floor, roof and sides, packs and other surfaces of the working place have been effectively wetted and kept wet to a distance of at least ten metres in either direction,

(ii) the working place is naturally sufficiently wet to render the formation of dust impossible, or

(iii) the working place is of a nature that might make wetting dangerous.

### **Regulation 212—Use of compressed air for cleaning underground prohibited**

(1) A person shall not use or cause another person to use in an underground mine or within twenty metres of the surface inlet to an airway only compressed air

(a) to clean any truck, skip or other conveyance unless the content of the truck, skip or other conveyance is thoroughly wet; or

(b) to blow out any drill hole or to blow over any rock surface unless the hole or surface is thoroughly wet.

(2) A mixture of compressed air and water may be used for the wetting as required in sub-regulation (1)(b).

(3) A person shall not, in an underground mine, use compressed air for the purpose of cleaning that person's body or clothing or the body or clothing of another person.

### **Regulation 213—Rock drills**

A person shall not in an underground working of a mine, use or cause or permit a subordinate to use a percussion rock drill unless

- (a) the drill steel used in the rock drill has an unrestricted axial hole of not less than 4.8 millimetres in diameter through which water may be fed to the bit;
- (b) an adequate supply of water flows through the drill steel; and
- (c) the working water pressure in the rock drill is maintained at not less than one hundred kilopascals.

### Lighting

#### **Regulation 214—Light to be carried underground**

A person shall not proceed underground into a mine unless that person has in that person's immediate possession an operable lamp of the type approved by the Chief Inspector of Mines and keeps that lamp alight and within safe and easy reach at all times.

#### **Regulation 215—Permanent lighting at specific places underground**

The manager of a mine shall ensure that in the mine

- (a) suitable and sufficient permanent lighting is provided and maintained at the following places underground if they are in regular use:
  - (i) each established station, landing or loading place and other similar place in vertical and inclined shafts, winzes and places where man winding is being carried out;
  - (ii) each main tip at which a self-propelled vehicle operates and each place where a self-propelled vehicle is maintained;
  - (iii) each main substation or substation; and
  - (iv) each main crusher station and each main conveyor drive unit; and
- (b) in places where there is winding, driving, permanent pumping or where other machinery, lighting is provided in a manner that ensures that while the machinery is in motion the moving part of the machinery can be clearly distinguished.

#### **Regulation 216—Lamp room for underground mines**

The manager of a mine shall

- (a) provide at the surface of the mine where underground work is carried out a separate room to be used as a lamp room;
- (b) appoint a competent person to be in charge of the lamp room; and
- (c) ensure that there is a lamp in the lamp room for each person who proceeds underground in the mine and that each lamp issued is in proper working order.

## Processing Plants

### **Regulation 217—General provisions for processing plants**

- (1) A person responsible for a processing plant shall ensure that the plant is designed and built in a manner that ensures that a person within the premises of the plant is not exposed to falling material, spilled, solid or liquid material, hot surfaces or any other danger.
- (2) A manager of a processing plant shall
  - (a) ensure that where the processing plant is operated at night the plant is provided with lighting that illuminates the entire plant;
  - (b) provide a back-up generator to supply power for lighting in case of a power cut in the plant;
  - (c) secure with a railing, areas within the plant installation where persons could fall from a height of more than one a half metres; and
  - (d) ensure that
    - (i) stairs, ramps, bridges and gangways are able to support the maximum weight;
    - (ii) floor grating on stairs, ramps, bridges and gang-ways are fixed in a manner that makes them immovable;
    - (iii) before any main plant equipment is started, an appropriate warning signal is given to person within the premises of the plant; and
    - (iv) plant areas, which may be entered only by authorised personnel, are locked and marked with warning signs.

### **Regulation 218—Responsibilities of a manager of a processing plant**

A manager of a processing plant shall ensure that

- (a) the plant is provided with a dust suppression or dust catchment system;
- (b) areas, where noise level is above 85 dB, are entered only by persons wearing ear protectors and are marked with warning signs; and
- (c) the plant is entered only by persons wearing appropriate personal protective equipment.

### **Regulation 219—Management of cyanide**

- (1) A person who engages in the procurement, transportation storage, use and disposal of cyanide products for gold processing purposes shall appoint a qualified person to be responsible for any activity that involves the cyanide products.
- (2) The manager of a mine is responsible for the safe procurement and transportation of cyanide products to the mine site.

### **Regulation 220—Risk assessment for gold processing plants that use cyanide**

(1) A manager of a gold processing plant that uses cyanide shall cause to be performed a baseline risk assessment of the gold processing plant.

(2) In furtherance of the assessment, the person responsible for the plant shall institute measures to

(a) eliminate any risks identified;

(b) control the risk, where some risk still remains after the effort aimed at elimination;

(c) minimise the risks, where the risk cannot be completely eliminated or controlled; and

(d) provide personal protective equipment, where the risks cannot be minimised.

(3) The manager shall cause programmes to be developed to monitor and periodically review the risks identified and the risks resulting from changes in work practices and procedures.

(4) The initial risk assessment of a gold processing plant using cyanide shall include an assessment of the

(i) procurement of cyanide;

(ii) transportation of cyanide;

(iii) off-loading of cyanide;

(iv) storage of cyanide;

(v) metallurgical operation;

(vi) maintenance;

(vii) decontamination;

(viii) impact on local communities; and

(ix) impacts on the environment.

(5) The manager shall ensure that a risk associated with a work practice which involves cyanide or cyanide containing solutions and slurries is assessed before the work practice is performed, in order to protect employees, the environment and members of the public.

### **Regulation 221—Training of staff working in gold processing plants that use cyanide**

(1) A person shall not be the manager of a gold processing plant that uses cyanide if that person is not appropriately qualified in extractive metallurgy, mineral processing, metallurgical or chemical engineering.

(2) A worker of a gold processing plant shall not be appointed for a cyanide specific task including the off-loading, issuing of clearance, permits for entering cyanide areas, testing and clearance for cyanide gases and supervision of cyanide storage areas unless that person is competent and meets specific training requirements appropriate to the work activities.

(3) Any other worker of the processing plant shall not operate or maintain processes which contain or transfer cyanide or cyanide which contains solutions and slurries unless that worker possesses qualification and has undergone training that is specific and appropriate to the work activities.

(4) A person working at a gold processing plant that uses cyanide shall not perform any task that exposes that person to the possible impacts of cyanide without that person having been assessed competent in the requirements listed in sub-regulation (5).

(5) The training requirements for a worker at a processing plant, who has responsibilities which directly or indirectly involve cyanide or cyanide which contains solutions and slurries, shall include

(i) training on task procedures developed from risk assessments;

(ii) emergency procedures and equipment;

(iii) location of emergency equipment and alarms;

(iv) risk assessment techniques;

(v) hazard identification;

(vi) environmental impacts;

(vii) lock-out and clearance procedures;

(viii) cyanide first aid treatment; and

(ix) handling of personal protective equipment and specialised breathing apparatus where appropriate.

### **Regulation 222—First aid in gold processing plants that use cyanide**

(1) A manager of a gold processing plant shall ensure that first aid and emergency medical treatment are administered by a competent person trained in a training facility and assessed as competent in first aid and emergency medical treatment procedure.

(2) A person trained to provide first aid and emergency medical treatment shall be competent in cyanide first aid treatment.

(3) A person who has attained competency in cyanide first aid treatment shall be issued with a certificate.

(4) A cyanide first aid certificate is valid for a period of twelve months but may be renewed subject to the owner of the certificate undergoing further tests of competency.

(5) A worker trained to provide first aid in a gold processing plant that uses cyanide shall undergo mob drills to test the competency of that worker every six months.

(6) The person responsible for the processing plant shall ensure that

(a) cyanide contamination is not extended to other plant employees or personnel administering first aid to cyanide victims; and

(b) precautions are taken to protect bystanders and the person administering first aid before and during first aid treatment.



(7) The manager shall ensure that there is provided at strategic Joints within ten metres distance from the workplace in a cyanide leaching plant,

- (a) a separate first aid post;
- (b) an ambulance; and
- (c) emergency showers and eyewash facility.

(8) The manager shall cause first aid kits to be put in

- (a) appropriate storage containers in strategic and conspicuous areas on the plant next to an emergency shower; and
- (b) in the plant control room.

(9) Where first aid kits are kept under lock and key, the person responsible for a processing plant shall ensure that the key is readily available at all times.

(10) The manager shall provide and cause to be properly keep first aid kits consisting of

- (a) a set of personal cyanide protective equipment for emergencies; and
- (b) special kits for emergency treatment of cyanide poisoning, consisting of antidotes and medical oxygen.

#### **Regulation 223—Personal protective equipment**

Personal protective equipment to be used by a person when entering high risk areas in the processing plant include

- (a) chemical resistant suits with hoods;
- (b) eye protection equipment in the form of a full face shield as a minimum requirement, and close fitting goggles;
- (c) cyanide compliant respirators;
- (d) elbow length rubber gloves; and
- (e) rubber safety boots.

(2) A manager of a processing plant shall ensure that where gas concentrations cannot be accurately monitored or protection by normal respiratory equipment cannot be guaranteed, self contained breathing apparatus are worn by workers who are exposed or likely to be exposed to poisonous gas under these circumstances.

(3) The manager shall provide mobile gas detection equipment.

(4) A gas detection equipment provided under subregulation (3) must be capable of accurately measuring hydrogen cyanide and make allowance for cross sensitivity effects of gases including acetylene.

**Regulation 224—Technical support to be supplied by manufacturers, suppliers and distributors of cyanide**

(1) A manufacturer of cyanide or a supplier or distributor of cyanide for use by a mining company shall supply technical information that will assist with the safe management of cyanide.

(2) A manufacturer, supplier and distributor of cyanide for use in a gold processing plant shall provide the following technical specifications and services:

(a) product information, material safety data sheets and basic chemistry of cyanide;

(b) information on specific personal protection equipment to be worn when handling cyanide or working with cyanide related equipment for both normal and abnormal situations;

(c) personal safety and hygiene recommendations for working with cyanide, including recommendations relating to washing of hands after handling cyanide and prohibition of smoking of cigarette or other tobacco products while handling cyanide;

(d) correct product handling and packaging methods for both liquid and solid cyanide;

(e) recommendations on details which relate to storage, facility design, construction, location, access, spillage area, piping and fittings, off-loading requirements, materials of construction, signage, site security and illumination;

(f) recommendations methods for the proper control of inventory levels and reagent scheduling;

(g) transportation and delivery requirements;

(h) off-loading and storage facility operating procedures;

(i) maintenance practices and procedures for tanks and equipment including preparation for vessel entry, isolation decontamination, scrap disposal and waste treatment;

(j) emergency response planning;

(k) first aid and medical treatment guidance; and

(l) detoxification procedures to handle cyanide spillages and cyanide contaminated equipment.

**Regulation 225—Procurement of cyanide**

(1) A supplier or distributor of cyanide for use in a gold processing plant shall use cyanide loading procedures that ensure the proper supply of the cyanide to a hauler or transporting company in order to prevent improper carriage or abuse of the cyanide.

(2) The cyanide loading procedures shall include the proper loading and off-loading of the cyanide into or onto an appropriate, approved and roadworthy delivery vehicle or tanker.

(3) A supplier or distributor of cyanide for use in a gold processing plant shall ensure that the cyanide delivery documentation correctly identifies the reagent being carried to ensure

(a) that proper corrective action can be taken in cases of vehicle accidents; and

(b) that there is proper off-loading, placement and storage of the cyanide at its interim or final destination.

(4) A supplier or distributor of cyanide for use in a gold processing plant shall ensure that the containers for the transportation of the cyanide are constructed in a manner that prevents spillage of cyanide and that ensures that the containers are leak free and watertight.

(5) A supplier or distributor of cyanide for use in a gold processing plant shall in consultation with the customers of that supplier or distributor, establish off-loading procedures which specify the requirements needed to ensure the safe transfer of cyanide from the supplier' or distributor's delivery vehicle into the storage facility.

(6) A supplier or distributor of cyanide for use in a gold processing plant shall supply the contents of delivery and quality control documentation for each separate cyanide delivery.

#### **Regulation 226—Transportation of cyanide**

(1) A transporter of cyanide shall ensure that

(a) each vehicle used to transport the cyanide is appropriate for the task and in a roadworthy condition at all times;

(b) checks are carried out before each tanker or delivery vehicle is loaded;

(c) appropriate preventive measures are installed on the tanker or delivery vehicle to prevent possible accidents or spillage during transportation;

(d) each vehicle used for the transportation of cyanide is equipped with a satellite tracking system which provides for early response in case of emergency;

(e) each delivery driver is trained and inducted for site specific off-loading procedures and cyanide first aid treatment;

(f) training and induction of delivery drivers are documented; and

(g) each drivers carries appropriate identification that confirms that driver's training and competence.

(2) A consignor of cyanide shall undertake regular audits of the haulage or transportation operations of that consignor's haulers or transporters to ensure suitability of each hauler or transporter employed.

(3) A transporter of cyanide shall ensure that loads containing cyanide are only left unattended in secured areas away from the public and with the vehicle locked at all times.

(4) A supplier or distributor of cyanide for use in a gold processing plant shall

(a) conduct detailed risk assessment of routes to be used for the delivery of cyanide;

(b) identify the major risk areas; and

(c) include detailed contingency and emergency plans in the event of an incident or accident.

(5) A person who transports cyanide for use in a gold processing plant shall transport the cyanide between the hours of 6.00 a.m. and 6.00p.m.

(6) A person who is driving a vehicle transporting cyanide shall park the vehicle in a secured place at 6.00 p.m.

(7) A person who transports cyanide for use in a gold processing plant shall ensure that the vehicle which is used to transport the cyanide has the following specifications:

- (a) a double walled, leak free and watertight tank, in the case of the transportation of liquid cyanide;
- (b) be equipped with leak detection mechanism automatic fire suppression system which can be activated automatically or by pressing a button, fire extinguishers and warning signs;
- (c) be subject to regular examination and be roadworthy;
- (d) be certified and be subject to pre-use vehicles;
- (e) be equipped with a GPS, MDS and carry flag; and
- (f) should not have retreaded tyres.

### **Regulation 227—Warehousing of cyanide**

A company that operates a cyanide warehouse facility that supplies or distributes cyanide to a gold processing plant shall

- (a) satisfy the packaging requirements specified in regulation 228;
- (b) keep personal protective equipment and cyanide first aid equipment on the site in accordance with regulations 222 and 223;
- (c) conduct a detailed risk assessment of the potential for accidental release of solid cyanide, cyanide solution or HCN gas at the facility and the effect on employees at the warehouse facility, adjacent and nearby businesses and communities;
- (d) develop emergency procedures to avoid harmful exposure or injury from cyanide and cyanide related products to members of the public and the environment;
- (e) ensure that the facility is not situated in a densely populated or highly active business area;
- (f) ensure that the facility is accessible to emergency services in the event of an incident or accident and ensure liaison with local emergency services on emergency planning not just for the facility but also for public roads, access ways leading to the facility and the property of the customer;
- (g) ensure that the warehouse facility is situated in an area where there does not exist possible risk for surface run-off water or water run-off from a possible fire fighting event to pollute the environment;
- (h) ensure that an automatic alarm system connected to a supervised monitoring service for security and to the local fire brigade for fire risks is installed and operational at the facility;
- (i) implement and manage an effective access control policy to the warehouse facility and ensure that only authorised and competent persons enter;
- (j) supply training including a general cyanide awareness, hazardous chemical response, personal protective equipment and cyanide first aid training, to employees who handle or transport cyanide to and at the warehouse facility or to its final destination;

(k) keep a formal cyanide stock inventory system including tracking features comprising among others stock numbers, weight, details of consignor and consignee which must indicate distribution to and from the facility;

(l) implement a formal traceability system for all cyanide containers and packaging which should include labelling or bar coding;

(m) implement a waste disposal system applicable to the specific warehouse site to prevent exposure of any cyanide or packaging material to the public domain;

(n) ensure that fire fighting equipment is compatible with cyanide in the event of fire and that persons working at the facility have been trained in its use; and

(o) ensure that appropriate lifting equipment is available for the loading and off-loading of cyanide and that personnel operating the lifting equipment have been trained and are competent in their use and that there is a pre-use checklist system to govern the effective and safe use of the equipment.

#### **Regulation 228—Packaging of cyanide**

(1) A manufacturer, supplier or distributor of cyanide for use in a gold processing plant shall ensure that customers, transporters and shipping and storage agents of cyanide package the cyanide, in a safe manner in order to prevent exposure of the public, production personnel and the environment to the cyanide.

(2) A supplier or distributor of cyanide for use in a gold processing plant shall ensure that the cyanide containers, boxes, or vessels are labelled in a manner that identifies

(a) the package contents, and

(b) hazard information, emergency response guidance and first aid treatment instructions.

(3) A supplier or a distributor of cyanide for use in a gold processing plant shall ensure that

(a) an empty package is handled as hazardous material until is de-contaminated and disposed of or destroyed using appropriate methods; and

(b) a cyanide package is always opened close to the point of use or transfer in order to minimise the area of exposure to potential spillages.

(4) A transporter of cyanide shall ensure that a container used for transporting cyanide is opened only in a well ventilated area.

#### **Regulation 229—Security of cyanide**

(1) A manager of a cyanide installation shall ensure that the installation is protected in a manner that does not expose the public, operating personnel and the environment to cyanide or cyanide reaction products as a result of unauthorised or unlawful removal of cyanide acts of sabotage.

(2) A transporter of cyanide and the manager of a gold processing plant shall ensure that

- (a) except in the case of an emergency, off-loading of cyanide is conducted at an approved off-loading site;
  - (b) unauthorised access to cyanide and the off-loading and storage facility is prevented.
- (3) A manager of a gold processing plant that uses cyanide shall
- (a) ensure that the storage facility for cyanide is situated on the premises of the gold processing plant;
  - (b) provide a fence and lockable gate to protect off-loading and storage facilities; and
  - (c) ensure that critical valves and infrastructure are intact and locked and that the keys are controlled through a key register.
- (4) A person who is not a competent person or who is not under the immediate supervision of a competent person shall not handle or move, or cause or permit any other person to handle or move cyanide, unless the cyanide is in a closed airtight and watertight container.
- (5) A person may remove or transfer cyanide from a gold processing plant
- (a) only if that person is authorised by the manager of the processing plant; and
  - (b) only after a risk assessment has been performed.
- (6) The manager of a gold processing plant shall prepare for the processing plant an emergency response plan which shall cover the response to and communication regarding any possible theft of cyanide and possible exposure of the public and the environment to the cyanide whether at or in transit to a gold processing plant.

#### **Regulation 230—Off-loading of cyanide**

- (1) A transporter of cyanide and the manager of a gold processing plant shall in relation to the transportation and the processing plant ensure that off-loading of cyanide is performed in a safe manner in order to prevent exposure of production personnel, members of the public and the environment to the impacts of the cyanide.
- (2) The manager of a gold processing plant shall in relation to that processing plant ensure that cyanide off-loading facilities are managed effectively in order to ensure the safe transfer of cyanide from suppliers and distributors to the plant.
- (3) A transporter of cyanide and the person responsible for the transportation of cyanide shall ensure that a vessel that contains aluminium, aluminium alloys, brass or materials containing magnesium, magnesium alloys, solder tinning or galvanised surfaces, is not under any circumstance used for transferring cyanide.
- (4) The manager of a gold processing plant shall in relation to that plant ensure that
- (a) the off-loading area for cyanide is provided with adequate illumination;
  - (b) each off-loading installation for cyanide is equipped with a wind direction indicator sock or ribbon;

(c) the wind indicator is clearly visible during off-loading of cyanide in order to prevent the exposure of the persons engaged in the off-loading to dust or HCN gas;

(d) each off-loading installation for cyanide

(i) has facilities that are sufficiently capable of draining and contain any cyanide spillage or surface run-off water;

(ii) is equipped with a sump and manually operated spillage pump that includes a level device with audible alarm; and

(iii) is equipped with ferrous sulphate reagent and shovels which are, kept close to the potential spillage are and

(e) the ferrous sulphate is kept in a dry condition and is available for use when required in spillage situations.

(f) the following symbolic signs shall be displayed at off-loading areas:

(i) "No entry to unauthorised persons";

(ii) "No smoking";

(iii) "No naked flames";

(iv) "Protective clothing to be worn";

(v) "Warning of poisonous substance";

(vi) "Warning of corrosive substance";

(vii) "Cyanide first aid procedures"; and

(viii) "Gas detection instrumentation".

(5) A transporter and the manager of a gold processing plant shall in relation to that plant ensure that

(a) appropriate special equipment are used for off-loading cyanide;

(b) off-loading cyanide does not commence until a formal inspection has been carried out by a competent person appointed by the person responsible for the processing plant in accordance to a site specific off-loading area checklist;

(c) the cyanide off-loading and storage facilities have been declared safe for off-loading of cyanide; and

(d) the off-loading is stopped if any leaks or other abnormal conditions develop during off-loading.

(6) On completion of off-loading of cyanide the driver of the vehicle which delivered the cyanide and the competent person appointed by the person responsible for the plant shall ensure that the equipment used and contaminated during the off-loading of cyanide is flushed and any spillage properly handled.

### **Regulation 231—Storage at the cyanide leaching plant**

(1) A manager of a gold processing plant that uses cyanide shall ensure that a vessel used for storage of cyanide at the plant

- (a) is constructed with the appropriate materials;
- (b) is fitted with the correct inlet flange;
- (c) has suction and delivery flanges on reagent and spillage pumps which have flange covers;
- (d) if that vessel is a tank is provided with a separate vent pipe;
- (e) if that vessel consists of a number of tanks has a separate overflow pipe for each tank where applicable;
- (f) has an accurate and reliable tank level indication, fitted with high level alarms, for each tank, and has load cells for the storage of flake cyanide;
- (g) which consists of a number of tanks and
  - (i) has a manhole fitted on each tank for the purpose of inspection and maintenance access;
  - (ii) is provided with an individual earth strap for each tank;
  - (iii) has walkways and access over and around the tanks with the walkways and access ergonomically designed with safe practice in mind;
  - (iv) clearly displays on each tank the required hazardous chemicals label; and
  - (v) has each tank clearly identified and painted signal red with a horizontal dark violet band of not less than four hundred millimetres wide located on the vertical centre of the tank;
- (h) has its capacity designed in a manner that makes it capable of accepting the operational frequency of required deliveries; and
- (i) holds at least one and a half times the capacity of the delivery tanker and has a minimum cyanide storage have capacity of at least twice that of a normal flake delivery vehicle.

(2) The manager of a gold processing plant shall ensure that

- (a) cyanide storage facilities at the plant have separate bund walls and are remote from existing or planned acid storage areas and that in the location of the storage area consideration is given to the prevailing wind in the area and proximity to buildings and control rooms;
- (b) symbolic warning signs that are in accordance with regulation 230(4) (f) are displayed at the cyanide storage area to indicate the hazardous nature of the cyanide;
- (c) appropriate illumination is installed in the storage area, at dosing pumps, valves, remote switches and alarm buttons;
- (d) flake cyanide storage, handling and mixing facilities are not located inside a building but in an area of free flowing natural ventilation which satisfies the following additional requirements:
  - (i) the outlet vents from storage vessels and mixing tanks shall be able to manage an overflow of seventeen cubic metres per minute without any build-up of pressure inside the vessel;



(ii) the storage vents shall pass through an effective dust and fume removal system before air is allowed to be discharged into the atmosphere;

(iii) if a wet dust extraction system is used, the outlet shall terminate at a point lower than the vent take-off points from the vessel;

(iv) the system used to feed flake cyanide from the storage to the mixing facility shall feature an emergency shutdown function in the event of over-supply of cyanide;

(v) the mixing facility shall be designed to allow for venting of the cyanide gas that is generated during the make-up process and proper make-up and mixing procedures shall be in place to prevent injury to plant personnel, the storage facility and the environment;

(vi) the solution into which flake cyanide is transferred before make-up shall be adjusted to a pH of 10.5 before the transfer occurs;

(vii) the conical bottoms of flake cyanide storage vessels shall be in two sections joined by flanges, nuts and bolts; and

(ix) fittings including pipes and valves shall be of the appropriate static-electric free materials and corrosion and abrasion resistant;

(e) briquette cyanide storage, handling and mixing facilities satisfy the following additional requirements

(i) storage areas shall be protected from infiltration of rain and flood water;

(ii) storage areas shall be well ventilated;

(iii) if partitioning of the storage areas occurs within a building the cyanide storage areas shall be properly fenced;

(iv) emergency egress from storage areas shall be easily accessible and free of obstacles;

(v) cyanide shall not be stored close to acidic reagents or explosive materials;

(vi) storage areas shall be at least hundred meters away from potable water and sewerage systems;

(vii) the required hazardous chemical labels shall be clearly displayed at the storage, handling and mixing facilities;

(viii) cyanide shall be stored at a level of a maximum two palettes heights above floor level;

(xi) the mixing facility shall be designed to allow for venting of the cyanide gas that is generated during the make-up process and proper make-up and mixing procedures shall be established to prevent injury to plant personnel, the storage facility and the environment;

(x) the solution into which briquette cyanide is transferred before make-up shall be adjusted to a pH of 10.5 before the transfer occurs in order to reduce the formation of cyanide gas; and

(xi)[sic] agitation in mixing tanks shall be stopped as soon as briquettes have been dissolved into solution in order to reduce the formation of cyanide gas;

(f) storage, mixing and processing with cyanide and cyanide containing solutions are carried out in banded areas which satisfy the following requirements:

(i) the floor shall be sited on a solid impervious area and enclosed by a flood tested, leak-proof bund wall;

(ii) the bund wall shall have no drain holes or any other opening which can allow cyanide effluent to escape from the bund area;

(iii) the bund walls shall be kept clean and free of any superfluous material;

(iv) the bunded area shall be capable of safely containing one hundred and ten percent of the total storage tank contents in the case of a single tank installation, and in the case of a multiple tank installation, one hundred and ten percent of the contents of the largest tank;

(v) where two or more vessels are connected for simultaneous use, the bund must be capable of accommodating the combined capacity of the tanks;

(vi) where the bunded area is to be used for flake cyanide, its size shall be determined taking into consideration the possible source of any spillage and a forty-five degree angle of repose shall be considered and allowance made for it;

(vii) the area shall be protected from storm water ingress from other areas and any solution, including rainfall contained within the storage facility bund area shall be returned to a process slurry stream at a point where the pH value is greater than 10.5;

(viii) a manually operated spillage control system shall be implemented which shall cater for the return of cyanide spillages and the effective and safe make-up and transfer of spilled cyanide back to the process; and

(ix) the field control stations for the valves and pumps which are required to control spillage in bund areas shall be located in positions remote from exposure to spillage.

(3) The manager of a gold processing plant shall in relation to that processing plant ensure that storage of cyanide and mixing and processing of other substances with cyanide and cyanide containing solutions are carried out under a safety system which satisfy the following requirements:

(a) a fully operational safety shower and eye wash bath shall be provided at the storage site;

(b) a wash water facility shall be available at the site at all times for use in emergency situations;

(c) cyanide first aid and emergency rescue equipment shall be situated remotely from the storage or potential risk area at a minimum distance of 7.5 metres, to prevent cyanide contamination, and at a maximum distance of 10 metres to enable it to be easily accessible from the storage or potential risk area and ideally next to the safety shower;

(d) where emergency rescue and first aid equipment is kept under lock and key, the keys shall be available in an emergency break-glass container;

(e) a neutralising reagent and a shovel shall be readily available close to the potential spillage area;

(f) the public shall not have access to the hazardous materials storage and off-loading area and the storage area shall be fenced and locked to prevent unauthorised access at all times;

(g) each separate off-loading and storage area gate shall be locked with its own unique lock and key set and keys shall only be issued by means of an official key register;

- (h) make-up and mixing systems for all forms of cyanide shall be equipped with audible alarm systems in order to alert personnel when the system is operational;
- (i) the safety of personnel at the site, in close proximity to the site and at the point of entry to the site shall be governed by a safety procedure developed by the person responsible for the gold processing plant;
- (j) an appointed responsible person shall check the facility daily using a site specific checklist to ensure the availability of all safety related systems;
- (k) entry into cyanide storage areas shall only be by competent persons and only after the necessary clearance is issued;
- (l) appropriate personal protective equipment shall be worn when entering cyanide storage areas; and
- (m) storage and bund areas shall be equipped with dry powder or foam type fire extinguishers.

### **Regulation 232—Transfer of cyanide to process**

The manager of a gold processing plant shall in relation to that processing plant ensure that

- (a) transfer of cyanide from the storage facilities into metallurgical process streams is performed safely and effectively without exposing production personnel, the public or the environment to the possible impacts of cyanide;
- (b) pumps, pipelines, flanges, valves and gaskets are not constructed of aluminium or aluminium alloys, magnesium or magnesium alloys, brasses and any tinned or galvanized materials in order to avoid the severe corrosion effects of caustic cyanide solution on these materials;
- (c) flanges on installed pipe work used for conveying cyanide solutions exceeding one percent strength are minimised and where the use of flanges is unavoidable, suitable flange covers are installed;
- (d) main solution valves are preferably stainless steel ball valves with polytetrafluoroethylene seats and seals;
- (e) pipelines are stress relieved before installation when heat tracing is performed to avoid the severe corrosion that can occur with heated, caustic cyanide solutions;
- (f) only gaskets made from clinkerite or red neoprene are used on pump, valve and pipe flange joints;
- (g) positive displacement pump discharge lines are fitted with a pressure relief valve venting back into the storage tank and the pressure relief system is maintained according to a scheduled maintenance plan;
- (h) where a ring main feed system is used, the return cyanide solution is discharged back into the same tank feeding the cyanide dosing pump;
- (i) each cyanide pipeline is inspected routinely and written procedures are established to deal with leaks;

- (j) each cyanide pipe, including lagged pipes, is painted dark violet at intervals along the entire length of the pipeline;
- (k) each cyanide pipeline is clearly identified to show whether it carries, calcium or sodium cyanide, and has an arrow indicating the direction of flow;
- (l) labels and arrows are placed at regular intervals on lagged pipelines;
- (m) where flake or briquette cyanide are directly transferred to process streams, the area is well ventilated and an audible alarm installed at the discharge point to alert plant personnel before the transfer and the transfer is covered by a specific procedure;
- (n) manual transfer of flake or briquette cyanide is performed only by a trained, competent person wearing the prescribed cyanide specific personal protection equipment;
- (o) containers or drums used for transfer remain fully closed until they reach the point of entry into the process streams;
- (p) discharge points of cyanide into process streams
  - (i) enter at a point which will create the lowest possible risk of exposure to personnel;
  - (ii) are risk assessed and a HCN gas detecting system installed at that point with an audible alarm to alert plant personnel;
  - (iii) enter the process stream at a point where the pH is maintained above 10.5 and which is well ventilated at all times and on-line pH monitoring is conducted including a linked audible alarm to alert personnel if the pH drops below 10.5; and
- (v) are not close to control rooms or buildings and control rooms or buildings are situated downwind from the discharge points;
- (q) there is a procedure that governs evacuation from the discharge points of cyanide and the preventive measures to be taken; and
- (r) acid, acidic solutions or low pH water does not enter at the same point where cyanide is discharged into the process unless it has been properly neutralised up to a pH of at least 10.5.

### **Regulation 233—General use of cyanide**

- (1) The manager of a gold processing plant shall in relation to that processing plant ensure that
  - (a) trained and competent personnel are responsible for the general usage of cyanide in the plant to prevent the exposure of production personnel, public and the environment to harm from the cyanide;
  - (b) the use of cyanide is controlled by safe working practices and procedures which include
    - (i) the use of proven methods by a trained and competent person to determine whether working areas are safe;
    - (ii) the issuing of correctly authorised Hot Work Clearance and Permit to Work;
    - (iii) compliance with safety precautions;

(iv) the use of approved respiratory and other personal protective equipment as specified in the Hot Work Clearance and Permit to Work;

(v) the control of hazards resulting from cyanide, cyanide gases and cyanide reaction products;

(vi) a description of the first aid equipment to be used;

(vii) emergency rescue procedures;

(viii) methods for cyanide leakage and spillage control;

(ix) cyanide decontamination methods;

(c) any work performed on equipment or facilities containing cyanide and any operational task performed on or close to that equipment or those facilities are performed only by a trained person;

(d) additions or modifications to working procedures, practices, standards and installed cyanide handling, storage equipment, reticulation, sampling and analytical measurement equipment are subject to a risk assessment prior to the implementation of the proposed addition or modification; and

(e) working areas suspected of containing cyanide or cyanide reaction products are monitored and equipped with suitable cyanide gas detection systems in order to warn personnel when the occupational exposure limit of 10 ppm is exceeded.

(2) A person shall not enter or work or be permitted by a manager of a gold processing plant to enter or work in any tank, vessel, pipeline, confined space or poorly ventilated area in that processing plant unless the concentration of cyanide, cyanide gases and cyanide reaction products is declared safe for work by a suitably trained and competent person.

(3) The manager of a gold processing plant shall in relation to that processing plant ensure that

(a) a person in the processing plant is not permitted to eat, drink or smoke in a cyanide working area, or while working with cyanide or cyanide reaction products;

(b) cyanide pipelines and storage tanks comply with the specified colour coding detailed in 231(g)(v) and that the colour coding and labelling are maintained to ensure proper visual identification;

(c) cyanide spillages are cleaned up immediately in accordance with developed procedures;

(d) suitable protective clothing are always worn when work is performed on or in the vicinity of any cyanide containing equipment or facility;

(e) operational procedures ensure that a pH of greater than 10.5 is maintained in process streams and circuits at all times to prevent the decomposition of cyanide to hydrogen cyanide gas;

(f) cyanide solutions are used only for the dissolution of gold in slurry streams, gold precipitation circuits, gold elution processes, carbon activity analyses and laboratory applications by competent personnel;

(g) acid washing and eluting of loaded carbon is not performed in the same column;

(h) an acid neutralisation step ensures that conditioned carbon is delivered back to the process at a pH in excess of 10.5. and spent acidic solutions are neutralised and transferred back into the process stream at a point where the pH is in excess of 10.5 and where there is a pH monitoring and alarm facility;

(i) cyanide is added to the metallurgical process in the correct amounts required for proper and effective dissolution of gold particles; and

(j) systems are in place to effectively control process parameters, including pH and cyanide control, and that these systems are calibrated on a regular basis to ensure safe operation of the plant.

#### **Regulation 234—Bunded areas and leak detection and recovery systems**

The person responsible for a gold processing plant shall in relation to that processing plant ensure that

(a) tanks and structures that contain or carry lethal solution are in bunded areas; and

(b) leak detection and recovery systems are installed for all structures that contain or carry lethal solutions.

#### **Regulation 235—Emergency ponds at gold processing plants that use cyanide**

The manager of a gold processing plant that uses cyanide shall provide for that plant, overflow ponds for cyanide solution containment which are sufficient for the maximum operating water balance and runoff from a one-in-hundred years twenty-four hour storm event.

#### **Regulation 236—Hazardous chemical response unit**

(1) The manager of a gold processing plant that uses cyanide shall in relation to that processing plant establish a Hazardous Chemicals Response Unit which shall be properly trained and equipped to deal with major chemical spills.

(2) The Hazardous Chemical Response Unit shall consist of not less than five persons who shall be, available at any time that the processing plant is in operation.

#### **Regulation 237—Emergency preparedness and response at gold processing plant that uses cyanide**

(1) The manager of a gold processing plant that uses cyanide shall in relation to that processing plant

(a) develop and maintain a comprehensive emergency plan to appropriately deal with on-site emergency conditions and to prevent the exposure of operating personnel, emergency personnel, the public and the environment from the possible impacts of cyanide;

(b) ensure that a risk assessment is conducted to identify all possible cyanide incidents or emergency conditions that may arise at that plant or metallurgical treatment facility;

(c) on the basis of the risk assessment, establish appropriate emergency response procedures;

(d) prepare and make available at a suitable location an emergency file which shall contain

(i) a full description of the metallurgical process;

(ii) a detailed site map showing the location of emergency equipment, cyanide off-loading and storage facilities, cyanide pumps and pipeline routes including spillage pumps dosing points, cyanide solution make-up tanks and equipment and any other area where cyanide is used; and

(iii) a copy of the cyanide emergency procedures and emergency contact numbers;

(e) communicate the emergency procedures to all plant personnel;

(f) revise annually the emergency procedures and prominently display the procedures at

(i) cyanide off-loading points;

(ii) cyanide storage areas;

(iii) control rooms; and

(iv) other identified risk areas;

(g) establish communication systems and formal procedures on metallurgical treatment facilities to notify management, emergency response personnel, institutions and local communities of any cyanide emergency incidents;

(h) supply emergency reaction personnel with route maps indicating the routes to be followed from base centres to the facility where cyanide is used;

(i) ensure the preparedness of that processing plant for any cyanide incident by

(i) conducting drills at six months intervals to test the emergency procedure for cyanide first aid treatment;

(ii) causing an audit of the complete response chain, including first aid, ambulance and hospital response to be conducted at six months intervals and taking action where appropriate; and

(ii) conducting drills to simulate other cyanide emergencies as identified in the risk assessments on a regular basis to ensure that plant personnel are familiar with emergency procedures and that they can respond appropriately; and

(iv) having emergency alarms including alarms on safety showers, panic alarms, spillage alarms, HCN gas detecting alarms and pH alarms regularly tested and checked on a daily basis, using a site specific check list

(j) ensure that

(i) a qualified person to provide first aid is present on site or that emergency services are alerted and that defective alarm systems are replaced or repaired immediately after a defect has been detected when specific high risk maintenance or other tasks are performed, including entry into storage tanks and confined spaces;

(ii) whenever work or activities are performed around a cyanide installation which poses an exposure risk to plant personnel, that work or activity is governed by a clearance procedure and emergency preparedness as provided by the Buddy System;

(iii) processing plant personnel are trained in emergency procedures and assessed as competent to recognize, and deal with, every possible cyanide emergency identified by the risk assessment; and

(iv) emergency reaction personnel are trained and made familiar with emergency cyanide first aid treatment

(2) The manager of a gold processing plant shall in relation to that processing plant ensure that where there is an emergency, the actions that shall be taken include the following:

(a) access to a scene of spillage, incident or accident shall be closed off and entry shall be controlled to prevent unauthorised access;

(b) a senior manager or an emergency co-ordinator, trained and competent in cyanide emergencies, shall take charge of emergency situations;

(c) the person to take charge of emergency situations shall be specified in the emergency procedures and shall during emergency wear apparel that is easily identifiable during emergency situations;

(d) the Chief Inspector of Mines or the inspector in charge of the area shall be informed immediately;

(e) entry into a contaminated area or scene of a cyanide accident, without wearing full cyanide specific personal protection equipment, for any reason whatsoever, shall be prohibited to all personnel including emergency personnel, and unless fully stocked cyanide first aid kits are available on site;

(f) as far as possible, clean-up of cyanide spillages shall be conducted by specialised hazardous chemical emergency response personnel;

(g) where it is necessary for production personnel to enter the contaminated area for the purpose of containing the spillage, the personnel shall wear full cyanide specific personal protective equipment including PVC suit and self contained breathing apparatus, and the Buddy system shall be strictly enforced;

(h) cyanide first aid shall be deployed to the incident site; and

(i) cyanide spills, incidents and accidents shall be properly investigated and appropriate actions taken to prevent the recurrence of a similar event.

(3) The manager of a gold processing plant shall in relation to that processing plant make available at each metallurgical treatment facility a dedicated emergency mobile trailer which shall be stored in a proper and safe manner to enable it to be rapidly deployed in the event of an emergency.

(4) The number and type of items for the trailer shall be based on an assessment of the risk exposure and the number of employees likely to be exposed.

(5) The manager of a gold processing plant shall in relation to that processing plant develop procedures to deal with cyanide spillages.

(6) The procedure shall at the barest minimum provide that

(a) where cyanide spillages are complexed, personal protective equipment shall be worn as identified in procedures developed from risk assessment of emergency conditions;

(b) each cyanide spillage shall immediately be cleaned-up in order to minimise the exposure to plant personnel, the public and the environment and in the case spillage in leach tanks and bund areas, the cyanide must be returned to the process as soon as possible;



(c) each cyanide spillage area shall be approached from an upwind direction using the Buddy System and that danger areas downwind from the spillage area shall be evacuated;

(d) the spillage are secured by putting in place warning notices and barricades;

(e) if solid cyanide is spilled during handling, the cyanide shall be returned to the container by using a shovel;

(f) if solid cyanide becomes wet for any reason, whether in drums or in storage vessels, the cyanide shall be used immediately or otherwise detoxified; and

(g) in extreme spillage cases, the assistance of the fully equipped Hazardous Chemical Response Team shall be called in.

(7) The manager of a gold processing plant shall in relation to that processing plant develop a plan for environmental emergencies which shall contain

(a) a map of the operational boundaries;

(b) direction and distances to neighbouring towns and communities;

(c) the position of main roads, railways and power lines;

(d) the position of rivers, ponds, canals and dams;

(e) a list of emergency services including contact details;

(f) a list of regional authorities including contact details;

(g) a list of relevant government departments including contact details; and

(h) a list of farmers, residences and businesses within the surface ownership, boundaries and areas downstream which are likely to be affected from the operation as identified during risk assessment including contact details.

(8) The plan shall be compatible with the emergency procedures.

(9) The managing of a gold processing plant shall in relation to that processing plant cause a risk assessment to be performed to identify all cyanide environmental emergencies or conditions that may arise in a metallurgical treatment facility, tailings dam complexes and associated infrastructure.

(10) The manager of a gold processing plant shall in relation to that processing plant develop emergency procedures which shall take into account the following risk areas:

(a) elevated levels of pollution in boreholes;

(b) seepage from process dams, tailings dams, and ponds into rivers and dams;

(c) elevated levels of cyanide in backfill products;

(d) solution and slurry spillages from plant boundaries and tailings dam complexes;

(e) overtopping of tailings dams, catchment and return water dams;

(f) instability of tailings dam embankment; and

(g) rupture of tailings pipeline.

(11) Procedures developed for cyanide environmental emergencies shall include

- (a) detoxification, clean-up and rehabilitation of spillages;
- (b) notification of mine personnel, emergency services and relevant government departments;
- (c) procedures to be followed by mine and plant personnel;
- (d) supply of potable water to affected areas or communities;
- (e) protection and evacuation of wildlife, livestock and flora; and
- (f) evacuation of local communities.

(12) The manager of a gold processing plant shall in relation to that processing plant and in consultation with stakeholders develop an emergency preparedness and response plan which shall include

- (a) communication of hazards to local communities and local authorities;
- (b) co-ordination of emergency response which will effectively deal with accidents and prevent major disasters;
- (c) training residents of local communities on how to act in event of an accident; and
- (d) liaison with local authorities.

#### **Regulation 238—Maintenance of gold processing plants that use cyanide**

The manager of a gold processing plant shall in relation to that plant

- (a) ensure that the inspection, maintenance and repair of equipment used for cyanide, as well as detoxification of cyanide contaminated objects are conducted in a manner that is safe and ensures that production personnel and the public are not exposed to the impacts of cyanide; and
- (b) conduct a detailed risk assessment of each general and repetitive engineering inspection and maintenance tasks performed in cyanide areas or on systems containing cyanide in metallurgical treatment facilities and develop detailed procedures and standards for conducting the tasks.

#### **Regulation 239—Cyanide measurement and monitoring**

(1) The manager of a gold processing plant shall in relation to that plant appoint a competent person to conduct regular HCN gas surveys in each area in a metallurgical treatment facility to identify high risk exposure areas.

(2) The measurements connected to the survey shall be performed during windless days.

(3) The manager of a gold processing plant shall in relation to that plant ensure that areas where HCN gas concentrations are likely to exceed 10 ppm are identified by means of proper notices stating the risk and monitored by means of fixed continuous detection instruments with a data logging facility.

(4) The monitoring system shall contain an audible alarm at the site, and specific procedures shall govern work practices and evacuation of personnel from the affected areas.

- (5) The manager of a gold processing plant shall in relation to that plant ensure that
- (a) measurements made for the detection and warning of the presence of cyanide gases and cyanide reaction products are performed continuously during periods of maintenance carried out on closed vessels, sumps, confined spaces and poorly ventilated areas;
  - (b) cyanide bearing effluent in and around the plant is identified, sampled and analysed for free, titratable and WAD cyanide and proper actions are taken to return the effluent to the process or to effectively detoxify the effluent;
  - (c) a management system is implemented to monitor cyanide levels in plant slurry and water reticulation systems in order to prevent circulation of possible high cyanide containing solutions which may arise from ineffective spillage detection systems; and
  - (d) measurement and monitoring equipment are calibrated as recommended by the supplier and a management system established for the recording of all the measurements made.

#### **Regulation 240—Detoxification**

- (1) The manager of a metallurgical treatment plant shall in relation to that plant ensure that
- (a) cyanide packaging, general wastes and contaminated plant equipment are detoxified and disposed off in a safe manner;
  - (b) effluent solution including storm water exiting the metallurgical treatment facility boundary conforms to the limits established by the Environmental Protection Agency, except where the solution is returned to the metallurgical process; and
  - (c) an equipment does not leave the facility unless it has been adequately decontaminated and a clearance certificate issued by the appointed responsible person.
- (2) The manager of a metallurgical treatment plant shall in relation to that plant establish a decontamination area to effectively deal with the decontamination of equipment and materials exposed to cyanide.
- (3) The decontamination area shall satisfy the following requirements:
- (a) be lined with concrete or other impermeable lining to prevent seepage;
  - (b) be well ventilated and bunded to prevent surface run off from or into the facility;
  - (c) be secured by means of a fence and locked access gate;
  - (d) have appropriate warning and information signs which are displayed;
  - (e) have a sump and manually operated spillage pump shall be installed, to transfer detoxified material back to the process;
  - (f) have the necessary safety equipment is available;
  - (g) be under the supervision of a responsible person; and
  - (h) satisfy any other requirements that may be determined, after the risk assessment.

### **Regulation 241—Environmental management of processing plant**

The manager of a processing plant shall in relation to that plant

- (a) develop and maintain a detailed and comprehensive water management program to prevent unintentional releases including maintaining adequate freeboard on tailings dam complexes;
- (b) cause to be conducted annual cyanide environmental audits and take appropriate action where required;
- (c) develop cyanide balance for each metallurgical treatment facility in order to establish consumption trends of cyanide by the various processes;
- (d) cause to be performed routine pulp, solid and solution flows on identified unit processes;
- (e) establish an effective surface water quality-monitoring programme in which daily monitoring is conducted at each medium to high environmental risk area including water dams that have the potential to overflow into a clean water catchment or beyond mine boundaries and conducting monthly monitoring at low risk areas including fresh water dams and springs;
- (f) establish an effective groundwater quality-monitoring programme; and
- (g) establish an effective tailings dam monitoring programme in which routine monitoring is conducted at penstock decants, penstock inlets, return water systems and underdrains.

### **Regulation 242—Tailing pipelines of processing plants that use cyanide**

The manager of a processing plant shall in relation to that plant ensure that

- (a) tailing pipelines transporting slurry from the processing plant to the tailings storage facility are placed in a banded and lined channel and that lined emergency ponds are located in valley areas of the pipeline route;
- (b) pipeline wall thicknesses are measured, recorded and monitored for wear on a quarterly basis depending on the operational requirements, wear rates are calculated as a function of tonnage throughput or of time;
- (c) the flanges of pipes are of a design approved by the Chief Inspector of Mines;
- (d) flow or pressure differential systems are installed on pipelines used for transferring cyanide containing slurries to ensure the controlled stoppage and notification of pipeline ruptures and associated spillage; and
- (e) a communication system is in place to allow for the reporting of spillages to a responsible person immediately after an incident or accident.

### **Regulation 243—Backfill**

The manager of a metallurgical treatment plant shall ensure that

- (a) the complexing of cyanide or cyanide reaction products in backfill preparation are conducted in a safe and reliable manner; and

(b) the product from the backfill preparation plant used for filling worked out areas underground, and the liquids draining from the filled worked out areas under ground, do not contain higher cyanide contents than the limit values established by the Environmental Protection Agency.

#### **Regulation 244—Electro-winning and smelting**

A manager of a processing plant shall in relation to that processing plant ensure that buildings, in which electro-winning cells and bullion ovens are operated, are ventilated and vapours and fumes are removed mechanically by a fume extraction system.

#### **Regulation 245—Heap leach pads general provisions**

(1) A manager of a gold processing plant shall cause a heap leach pad to be constructed for the plant in accordance with these Regulations.

(2) The heap leach pad shall be designed and constructed in a manner that ensures that the effluent from the pad into the environment complies with the limit values established by the Environmental Protection Agency.

#### **Regulation 246—Design of heap leach pad**

A manager of a gold processing plant shall ensure that

(a) a heap leach pad in the plant has

(i) an emergency pond that can contain run-off water from the heap leach of a one-in-hundred years twenty-four hour storm event;

(ii) one borehole at each side to control ground water quality;

(iii) a soil liner of not less than thirty centimetres with a permeability of less than  $1 \times 10^{-7}$  cm/sec;

(iv) a drainage blanket of not less than fifty centimeters; and

(v) a HDPE liner with a permeability of less than  $1 \times 10^{-11}$  cm/sec;

(b) the drainage blanket is equipped with a leak detection system and a drainage system for recovery of the leakage; and

(c) a heap leach pad is not operated if the HDPE liner is defective.

#### **Regulation 247—Operation of heap leach pad**

The manager of a gold processing plant shall develop and implement for the heap leach pad

(a) an operating plan which shall include a fluid management plan; and

(b) a monitoring programme.

(2) The manager of a gold processing plant shall keep and maintain detoxification equipment within five meters from the heap leach pad.

#### Auxiliary mine surface facilities

#### **Regulation 248—Ventilation in surface plants**

A manager of a mine shall in relation to the mine, ensure that adequate ventilation is provided in any surface plant or building or any part of a surface plant or building in which a person may travel or work and where dust is released, or is likely to be released, or where toxic gas or fume is evolved or is likely to be evolved.

#### **Regulation 249—Discharge of dust, gas and fumes into the atmosphere**

A manager of a mine shall in relation to the mine, ensure that any harmful dust or toxic gas or fume removed or evolved from any process is, if not otherwise recovered, collected or disposed of, discharged into the atmosphere at an adequate height and distance which shall not be less than seventy-five metres measured horizontally from the nearest point of any surface inlet to the underground workings.

#### **Regulation 250—Removal of toxic substances**

(1) The manager of a mine shall in relation to that mine, provide adequate means for the positive removal at source, or as near to the source as practicable of any toxic substance, other than dust, which may escape or be released from any surface plant or building in which the substance is handled, processed, stored or evolved.

(2) The manager of the mine shall cause any substance removed in compliance with subregulation (1) to be disposed of in a safe manner.

#### **Regulation 251—Washing facilities where toxic substance is handled**

The manager of a mine shall in relation to the mine ensure that where any toxic substance is handled, processed or stored, there are provided for persons who may be endangered by the toxic substance,

(a) adequate and sufficient washing facilities to be used by those persons before eating any food while at the mine and before leaving work; and

(b) where those persons are permitted to eat food at any time during their working hours, adequate accommodation for eating immediately adjacent to the washing facilities.

#### **Regulation 252—Workshops**

(1) The manager of a mine shall ensure that workshops in the mine have two separate means of entry and exit where machinery is operated in the workshop or the workshop contains an air compressor or electrical switchgear, transformer or generating plant, but an inspector may grant exemptions in writing on conditions that the inspector considers necessary.

(2) The manager of a mine shall in relation to the mine, ensure that

(a) the floors of workshops have demarcations that indicate

(i) walkways;

(ii) work areas; and

(iii) storage areas;

(b) stationary grinding machines other than special bit grinders in the workshops, are equipped with among others

(i) periphery hoods capable of withstanding the force of a bursting wheel and enclosing not less than two hundred and seventy degrees of the peripheral of the wheel;

(ii) adjustable tool rest, set so that the distance between the grinding surface of the wheel and the tool rest is not greater than three millimetres; and

(iii) a safety washer on each side of the wheel;

(c) power drills, disc sanders, grinders and circular and chain saws when used in the handheld mode are operated with controls which require constant hand or finger pressure;

(d) circular saws and chain saws are not equipped with devices which lock on the operating controls;

(e) oxy-acetylene cylinders are properly secured in an upright position and their hose lines equipped with two flash back arresters at both ends of the hose lines;

(f) oxy-acetylene cylinder valves are covered with caps when being transported or stored;

(g) welding bays are provided with protective screens and means to remove the fumes produced;

(h) periodic tests are conducted on the following equipment or tools and the results of the tests are kept in a register in the workshop

(i) ladders and scaffolds;

(ii) welding machines;

(iii) safety harness; and

(iv) portable electrical equipment;

(i) overhead travel and tower cranes operated by remote control system are disabled safely where

(i) communication with the control system is lost;

(ii) the control system fails; and

(iii) it operates outside its designed parameters;

(j) in the inflation of a tyre, a wheel cage or other restraining device to constrain all the wheel rim components from fly off is used to prevent injury to persons;

(k) pits or ramps used for the repair of equipment are covered or effectively barricaded when not in use; and

(l) the safe working load of jacks and blocks used in support of equipment is indicated on them.

### **Regulation 253—Electric power stations**

The manager of a mine shall in relation to the mine

- (a) provide for safe storage of fuel in accordance with the provisions of regulation 255;
- (b) ensure that the electric power station is fenced and only authorised persons are allowed to enter the area; and
- (c) ensure that technologies to reduce noise and to reduce contaminants in the exhaust gases are applied.

### **Regulation 254—Compressor stations**

The manager of a mine shall, in relation to the mine ensure that

- (a) the compressor station is fenced and only authorised persons are allowed to enter the fenced area; and
- (b) technologies to reduce noise are applied.

### **Regulation 255—Fuel filling stations**

The manager of a mine shall, in relation to the mine ensure that

- (a) fuel tanks are located in a bunded area made of concrete and the bunds are capable of storing one hundred and ten per cent of the largest tank;
- (b) the fuel filling station is located in a fenced area;
- (c) the filling station and fuel tank areas are equipped with fire extinguishers;
- (d) refuelling of a vehicle is not allowed while the engine is running;
- (e) tanks and fuelling installations are inspected and maintained routinely to prevent leaks and spills;
- (f) spilled fuel and contaminated materials are retrieved, handled, and disposed of in an environmental friendly manner; and
- (g) fuel spillages outside the bunded area are recorded and those that reach beyond the mine environment are reported to the Inspectorate Division.

### **Regulation 256—Water-oil separator**

The manager of a mine shall, in relation to the mine, ensure that mechanical workshops, fuel fillings stations, wash bays and parking areas for heavy duty equipment

- (a) are equipped with a water-oil separator; and
- (b) have a concrete floor and a drainage system leading into a water-oil separator.



### **Regulation 257— Warehouses and stockyards**

(1) The manager of a mine shall, in relation to the mine, ensure that

(a) each warehouse and stockyard had equipment which is capable of handling the heaviest parts stored in the facility;

(b) only equipment which is in good working condition and manufactured for handling of the parts is used;

(c) materials including spare parts and consumables are stored in a safe and orderly manner that enables the stored materials to be removed safely; and

(d) areas, where equipment or parts of equipment containing fuel, oil, lubricants and a cooling liquid are stored, have a concrete floor and a drainage connection to a water-oil separator.

### **Regulation 258—Working in confined spaces**

The manager of a mine shall, in relation to the mine, ensure that subject to regulation 259, a confined space is entered only where

(a) there is an easy egress from all accessible parts of the confined space;

(b) mechanical equipment in the confined space is

(i) disconnected from its power source, and

(ii) locked out;

(c) pipes and other supply lines except those required for the work in the confined space are blanked off; and

(d) the confined space is tested and evaluated by a competent person who,

(i) records the results of each test in a record book, and

(ii) certifies in writing in the record book that the confined space, is free from hazard, and will remain free from hazard while any person is in the confined space, having regard to the nature and duration of the work to be performed.

### **Regulation 259—Working in confined spaces in which hazards could exist**

The manager of a mine shall, subject to regulation 260, ensure that in relation to that mine, a confined space in which

(a) there exists or is likely to exist a toxic gas, vapour, dust or fume; or

(b) the oxygen content in the atmosphere is less than nineteen per cent or more than twenty-three per cent by volume, is not entered unless

(i) the requirements of regulation 258 are complied with;

(ii) the space is purged and ventilated to provide a safe atmosphere;

- (iii) the measures necessary to maintain a safe atmosphere has been taken;
- (iv) another person is stationed outside the confined space;
- (v) suitable arrangement has been made to remove the person from the confined space should that person require assistance; and
- (vi) a person adequately trained in artificial respiration is available.

**Regulation 260—Working in confined spaces where hazards which cannot be purged could exist**

Despite regulations 258 and 259, the manager of a mine shall in relation to the mine ensure that a confined space in which,

- (a) there exists or there is likely to exist a toxic gas, vapour dust or fume; or
- (b) the oxygen content in the atmosphere when measured is less than nineteen per cent or more than twenty-three percent by volume, and which cannot be purged and ventilated to provide and maintain a safe atmosphere is only entered if,
- (c) the requirements of the regulation 258, other than subregulation (d) (ii), are complied with;
- (d) the person entering is using a suitable self contained breathing apparatus and a safety harness or other similar equipment to which is securely attached a rope, the free end of which is held by a person who is keeping watch outside the confined space;
- (e) a person entering is using any other equipment that is necessary to ensure that person's safety;
- (f) the safety harness rope or other equipment being used by the person entering have been inspected by a competent person and are in good working order; and
- (g) a person adequately trained in artificial respiration is available.

**Regulation 261—Permanent lighting at specific stationary machinery and surface installations**

The manager of a mine shall in relation to that mine ensure that

- (a) places where winding, driving, permanent pumping or any other machinery is erected is, while the machinery is in motion so lighted that the moving part of the machinery can be clearly distinguished; and
- (b) suitable and sufficient permanent lighting is provided and maintained at each place on the surface where work is regularly carried out during the hours of darkness or where normal day light is inadequate for the work.

**Regulation 262—Emergency lighting in buildings**

The manager of a mine shall in relation to that mine ensure that a work place in a building which is solely dependent on artificial lighting and in which a failure of the regular lighting system would create conditions that might endanger the safety of any person in the building, is provided with emergency lighting which

- (a) turns on automatically when regular lighting fails;
- (b) is independent of the regular lighting source;
- (c) provides adequate illumination for the evacuation of the building; and
- (d) is tested as frequently as necessary to ensure it will function in an emergency

Tailings storages facilities

**Regulation 263—Hazard classes**

(1) A manager of a mine shall in relation to the mine, ensure that tailings storage facilities comply with the hazards classes as follows:

Hazard class	Affected persons	Environmental/material damage
C		
B		
A		
not allowed	0	
1—20		
21 - 50		
> 50		
moderate		
serious		
very serious		

(2) The Chief Inspector of Mines shall establish specific minimum standards for each hazard class.

(3) Standards established in sub-regulation (2) shall in the case of a more dangerous facility provide

- (a) a higher safety standard;
- (b) a specific construction method;
- (c) a higher static safety factor for the embankment; and
- (d) increased control and inspection.

(4) A manager of a mine shall in relation to that mine ensure that

(a) the location of a tailings storage facility is in an area where the failure of the embankment is not likely result in a threat to human life; and

(b) the tailing facility is not under any circumstance located in a place where the failure of an embankment would affect more than fifty dwellings

### **Regulation 264—Embankments**

A manager of a mine shall in relation to the mine, ensure that

- (a) the embankments of tailings storage facilities in hazard class A or B are constructed by downstream method;
- (b) upstream and centre line construction methods are only used for tailings storage facilities in hazard class C;
- (c) the area for the construction of an embankment is cleared of vegetation, topsoil and weak ground;
- (d) there is a proper foundation for the embankment;
- (e) the material used for the construction of an embankment is resistant to liquefaction;
- (f) the soil used for the construction of an embankment is suitable for the purpose and the soil is placed in layers of not more than thirty centimetre and compacted;
- (g) the embankments have a drainage system to control the phreatic surface and seepage;
- (h) water which has seeped outside the embankment from the tailings storage facility is collected in a sump and pumped back into the tailings storage facility;
- (i) the structural requirements of embankments are calculated by a qualified engineer;
- (j) minimum safety factors for static and dynamic load according to a specific calculation method are established;
- (k) for a hazard class C facility, a static load safety factor of 1.5 is applied,
- (l) for a hazard class B facility, a safety factor of 1.6 is applied;
- (m) for a hazard class A facility, a safety factor of 1.7 is applied;
- (n) the construction of the embankment is supervised by a qualified engineer who shall submit reports to the Inspectorate Division;
- (o) an embankment provides for a freeboard of not less than one metre to ensure that the impoundment has enough capacity for water inflow during storm events; and
- (p) an embankment is designed in a manner that enables the tailings storage facilities to store water inflow of the respective catchments area of a one-in-hundred-year twenty-four hour storm event that has a freeboard of not less than one metre, and to prevent overtopping of embankments and unacceptable phreatic surfaces in embankments.

### **Regulation 265—Tailings storage facility impoundment**

A manager of a mine shall in relation to the mine ensure that the impoundment

- (a) is cleared of vegetation and the topsoil is removed;
- (b) has an under drainage system; and

(c) has a clay liner, which is thirty centimetre thick, and placed in a manner that ensures that permeability is less than  $10^{-6}$  cm/s or has a competent bedrock or other geological formations underlying the site and which have been demonstrated to provide an equivalent degree of containment.

#### **Regulation 266—Tailings discharge system**

A manager of a mine shall in relation to the mine ensure that tailings are discharged into a tailings storage facility in well arranged beaches by spigotting and that there is under no circumstances only one point of discharge.

#### **Regulation 267—Safety arrangements of tailings storage facilities**

A manager of a mine shall in relation to the mine ensure that

(a) an emergency spillway is constructed which leads into an emergency pond for treatment of overflow from the tailings storage facility before release into the environment;

(b) the spillway is lined with gunite or concrete in a manner that ensures that overflowing water cannot erode the channel;

(c) an emergency pump and an emergency electric power generator is available to be installed at any time in case of exceptional high water inflow or in case of the failure of the installed equipment; and

(d) the system to divert natural run-off water from entering the tailing storage facility has a capacity for a one-in-thousand year twenty-four hour storm event.

#### **Regulation 268—Monitoring of tailings storage facilities**

A manager of a mine shall in relation to the mine ensure that

(a) seepage through embankments are monitored by piezometer holes which are drilled into the embankments and in the case of an embankment

(i) of thirty metres length, the piezometer hole is installed at the middle of the crest;

(ii) which is longer than thirty metres but less than one hundred and twenty metres there are two piezometer holes;

(iii) which is longer than one hundred and twenty metres but less than two hundred and forty metres there are three piezometer holes; and

(iv) which is longer than two hundred and forty metres there are piezometer holes at a distance of not more than thirty metres from the side of the embankment and not more than sixty metres between two neighbouring piezometer holes; and

(b) additional monitoring holes are drilled at appropriate distances around any tailings storage facility to monitor seepage from the tailings into the groundwater.

**Regulation 269—Design and construction of tailings storage facilities to be done by qualified engineer**

A manager of a mine shall in relation to the mine ensure that the design, construction and monitoring of a tailings storage facility is carried out by a qualified engineer approved by the Chief Inspector of Mines.

**Regulation 270—Plans and audits for tailings storage facilities**

(1) A manager of a mine shall before the construction work on a tailings storage facility in the mine submit to the Inspectorate Division for approval the initial operating plan of the tailings storage facility which plan shall consist of

- (a) an engineering design report;
- (b) an operating plan;
- (c) a monitoring plan;
- (d) a water management and cyanide management plan;
- (e) an emergency preparedness plan; and
- (f) a preliminary closure plan.

(2) The preliminary closure plan shall provide safety measures to deal with unforeseen events which may occur.

**Regulation 271—Plans and specifications of tailings dam**

(1) The plans and specifications required to be submitted to the Chief Inspector under regulation 270 shall contain

- (a) in the case of a proposed dam,
  - (i) a contour plan of the locality and a cross-section and a site plan of the dam together with particulars of the strata in or on which each embankment is to be constructed;
  - (ii) a longitudinal section showing the slope of the bed of the river;
  - (iii) plans of the vertical end and mid-section of the embankments showing the position, size and details of all spillways;
  - (iv) details and nature of the materials proposed to be used in the construction, and particulars of the method of placing the materials in the formation of the embankments;
  - (v) the safety factor allowed in the strength of the embankments;
  - (vi) the estimated capacity of the dam;
  - (vii) the estimated area of the catchment or maximum known flood capacity of the river or stream on which the dam is to be constructed;
  - (viii) the average and maximum known rainfall;

- (ix) the estimated discharge capacity of spillways;
  - (x) the results of geotechnical investigations of the location of the dam;
  - (xi) particulars of the course of overflow waters indicating whether it is through or adjacent to any populated area or locality; and
  - (xii) details of the measures to be adopted in order to ensure safety in the event of an unprecedented rainfall, the bursting of the dam or the flooding of areas exterior to any natural channel or water-course by an uncontrolled escape of water and tailings from the dam;
- (b) in the case of the dam already constructed but intended to be enlarged or altered
- (i) plans, sections, details and particulars of the existing dam and the embankments and other details and the information that is required by paragraph (a) in connection with the construction of a dam;
  - (ii) particulars of any alteration in the capacity of the dam; and
  - (iii) an assessment of risks arising from the enlargement of the dam.
- (2) The plans and sections shall be drawn to scale and all essential measurements shall be plotted on them.

#### **Regulation 272—Commissioning and audit of tailings dam**

- (1) A manager of a mine shall not in relation to the mine use a tailings dam which is constructed, enlarged or altered under these Regulations, until an inspector has inspected the dam and certified that it is in a condition that does not, to the extent practicable, make it a danger to health and safety.
- (2) A manager of a mine shall in relation to the mine, employ an independent qualified engineer to conduct yearly annual dam safety audits.

#### **Regulation 273—Discontinuance of dam**

The holder of a mining lease shall within fourteen days after discontinuing the use of a dam, notify the Chief Inspector of the discontinuance by written notice as set out in Form Twenty-Five in the First Schedule.

#### Rehabilitation and mine closure

##### **Regulation 274—General provisions for mine site rehabilitation and closure**

- (1) The holder of a mining lease shall before closing a mine site, satisfy the Chief Inspector of Mines that each source of potential pollution and component of the mining project that is to be closed are designed to be stable in the long term.
- (2) The holder of the mining lease shall
- (a) ensure that emission of polluted water, air or dust does not occur from the closed mine site;

(b) submit a mine closure plan to the Inspectorate Division for approval in accordance with regulation 275; and

(c) within twelve months after the closure of the mine rehabilitate mining areas which are no longer required for the mining operations.

#### **Regulation 275—Mine closure plan for intended closing or abandonment**

(1) The holder of a mining lease who intends to close or abandon the mine or a major part of the mine, shall submit a Mine Closure Plan to the Chief Inspector of Mines for approval as set out in Form Twenty-Six of the First Schedule.

(2) The Mine Closure Plan shall be submitted as soon as is reasonably practicable, but not later than sixty days before the beginning of the process of closing or abandoning the mine or a major part of the mine.

(3) The Mine Closure Plan shall include a description of

(a) the closure and rehabilitation of open pits;

(b) the procedures for safeguarding, closure and rehabilitation of underground mine sites with an explanation of the methods by which

(i) the shaft compartments are to be abandoned and hoisting ropes disposed of; and

(ii) the shafts and entrances from the surface are to be secured;

(c) the methods by which

(i) explosives, fuses and detonators will be disposed of; and

(ii) the remaining chemical reagents, fuel, lubricants and other chemical substances are to be removed and disposed off;

(d) the closure and rehabilitation plants;

(i) preparation and process plants;

(ii) heap leach pads;

(iii) process ponds;

(iv) ancillary facilities;

(v) tailings storage facilities;

(vi) waste dumps; and

(vii) other installations at the mine site.

(4) The mine closure plan shall

(a) provide an inventory of contaminated areas and a description of the methods by which these are to be rehabilitated;



- (b) include the use to which the land is proposed to be put after the restoration and a statement of the utility and capacity of the restored land to support a variety of alternative uses; and
- (c) be accompanied with the plans mentioned in regulation 276.

#### **Regulation 276—Submission of plans before closure of a mine**

The holder of a mining lease shall ensure that before the mine or any part of the mine is closed, abandoned or otherwise rendered inaccessible,

- (a) the plans required by regulation 67 are updated; and
- (b) copies of the plans are
  - (i) certified as correct by the holder of the mining lease; and
  - (ii) forwarded to the Chief Inspector of Mines

#### **Regulation 277—Closure of open pit mines**

The holder of a mining lease shall

- (a) satisfy the Chief Inspector of Mines that the pits in the mine do not have the potential to pollute any water source, and
- (b) where an open pit mine is closed permanently or for an indefinite period.
  - (i) secure the open pit mine to prevent unauthorized entry and post warning signs to that effect at the mine; or
  - (ii) perform remedial work at the mine so that the workings at the mine present no greater hazard than the prevailing natural topographic features of the area.

#### **Regulation 278—Openings to underground mines**

- (1) The holder of a mining lease shall where a shaft, raise, adit or other opening to the surface of the mine is abandoned or where the workings at the mine are discontinued, ensure that the shaft, raise, adit or other opening is secured against unauthorized entry in accordance with this regulation.
- (2) A shaft, raise, audit or other opening shall be secured by covering it at the top at bedrock or at the top of the concrete collar of the shaft, raise, adit or opening with a bulkhead of reinforced concrete designed by a professional engineer.
- (3) The holder of the mining lease shall ensure that the cover required unr[sic] sub-regulation (2) is clearly marked with a substantial one-metre high marker or sign that identifies the party responsible for the opening and the cover.

#### **Regulation 279—Disposal of explosives**

The holder of a mining lease shall, where a mine is to be closed or abandoned,

(a) ensure that each explosive, detonator or detonating cord is disposed of in a safe manner and in accordance with the manufacturer's instructions; and

(b) at least fourteen days before the disposal of any explosive, detonator or detonating cord, notify the Chief Inspector of Mines in writing of the disposal procedure to be used.

#### **Regulation 280—Closure of processing plants**

The holder of a mining lease shall rehabilitate the site of the processing facilities and decontaminate the sites of refineries, assay labs and associated areas of the mine.

#### **Regulation 281—Securing Hazardous plants**

The holder of a mining lease shall where a mine or any part of the mine is to be closed or abandoned and the plant associated with that mine or part of a mine presents a hazard, secure the plant to protect the plant against unauthorized entry.

#### **Regulation 282—Closure of ancillary facilities**

The holder of a mining lease shall, where a mine or part of a mine to which the lease relates is closed down or abandoned, rehabilitate and decontaminate the sites of ancillary facilities.

#### **Regulation 283—Closure of heap leach pad**

The holder of a mining lease shall where a heap leach pad at the mine is to be closed,

(a) take measures to prevent meteoric water from infiltrating through the component;

(b) design the closed heap leach facility to be stable for the long term;

(c) carry out heap detoxification activities for WAD cyanide if applicable;

(d) provide the required pore volume, application rates and duration, and planned sampling of the heap in the respective operating plan;

(e) provide a drain down curve and records of facts and assumptions used in predicting what the long-term residual volume of drain down will be;

(f) provide heap effluent treatment, where necessary, and specific details of other items including dosing tanks, sampling ports, active and passive treatment systems, and the disposal system for treated effluent; and

(g) establish procedures for initiating final closure activities on the heap surface including re-sloping, capping or covering, solar reshaping and construction of diversion ditches.

#### **Regulation 284—Closure of tailings storage facilities**

The holder of a mining lease shall where a tailings storage facility at the mine is to be closed,

- (a) take measures to prevent meteoric water from infiltrating through the component;
- (b) ensure that tailings storage facilities are stabilised in the long term;
- (c) establish procedures for initiating final closure activities on the tailings storage facilities including surface re-sloping, capping or covering and construction of diversion ditches; and
- (d) comply with the limit values for tailings storage facility effluents established by the Environmental Protection Agency.

#### **Regulation 285—Closure of process ponds**

Where the holder of a mining lease proposes to

- (a) leave the pond solids, pond liner and process components at the mine in place, the mine closure plan shall describe the method of stabilization or encapsulation; and
- (b) backfill the pond, the mine closure plan shall describe how the pond liner, pond solids and process components are to be removed and disposed off and the type of backfill material and revegetation proposed.

#### **Regulation 286—Closure of waste dumps**

The holder of a mining lease shall

- (a) ensure that waste rock disposal areas are stabilised, reshaped and rehabilitated according to the mine closure plan;
- (b) ensure that slopes are reduced to less than 3 horizontal is to 1 vertical with bench terracing for benches greater than ten metres in height; and
- (c) implement acid rock drainage prevention measures.

#### General provisions for machinery

#### **Regulation 287—Code of safe working practice**

- (1) The manager of a mine, shall in relation to the mine, draw up for the approval of an inspector a code of safe working practice to be used by persons engaged in the installation, maintenance and repair of any machinery, equipment or appliance.
- (2) The code of safe working practice shall
  - (a) specify procedures for the prevention of danger arising from the inadvertent start up or electrical energising of machinery, equipment or appliances; and
  - (b) provide procedure for the pre-check of any equipment being used at the mine by the operator.
- (3) The manager of the mine shall ensure that the provisions of the code of safe working practice are observed in the mine at all times.

### **Regulation 288—Responsibility of engineering manager**

- (1) An engineering manager of a mine shall take reasonable precautions to ensure the safety of persons in the mine in respect of machinery used in the mine
- (2) The engineering manager shall be responsible for compliance with the regulations affecting the safety of persons, but the appointment shall not relieve the manager of the mine of ultimate responsibility for safety in the mine.
- (3) The engineering manager shall report to the manager of the mine any mechanical or electrical defect or condition which may be dangerous to life or limb.

### **Regulation 289—Condition of safety appliances**

The engineering manager of a mine shall

- (a) ensure that the prescribed safety appliances are maintained in good working condition and are properly used; and
- (b) stop the working of any apparatus which appears or has become dangerous.

### **Regulation 290—Competent person to be in charge**

The engineering manager of a mine shall, in relation to that mine, ensure that

- (a) a competent person is in charge of or supervises each machinery that is used in the mine; and
- (b) each machinery in use in the mine is kept in good working condition and thorough repair, and is adequately protected from the vagaries of the weather.

### **Regulation 291—Continuous supervision necessary**

The engineering manager of a mine shall ensure that a person who is in charge of a mechanical appliance which for the purpose of safety of life or limb requires constant supervision is not

- (a) absent from or does not cease to have continual supervision of that mechanical appliance during the periods for which that person is in charge unless that person is replaced by a competent person; or
- (b) caused, or allowed to work more than eight hours per day except where written permission is given by the manager.

### **Regulation 292—Efficient guards to be provided**

The engineering manager of a mine shall

- (a) provide efficient guards for the parts of each machinery and electrical apparatus in the mine that may be a source of danger to persons; and
- (b) ensure that
  - (i) the guards are kept in position and properly maintained,

(ii) where a guard is for the purpose of repairs temporarily removed from that guard's post a guard is sent to that post as soon as the a[sic] guard is sent to that post as soon as the repairs are completed; and

(iii) proper precautions are taken for the safety of persons where a guard is temporary employed for the purpose of the repairs.

#### **Regulation 293—Fences and guards not to be removed**

A person shall not without the consent of the engineering manager of the mine damage or remove any fence or guard installed to protect other persons from dangerous places, exposed machinery, electrical apparatus or plant.

#### **Regulation 294—No interference with machinery**

(1) A person shall not enter a place in a mine where machinery and electrical apparatus are installed unless that person is authorised to do so.

(2) The manager of a mine shall post notices at places in the mine where machinery and electrical apparatus are installed, specifying that those places are prohibited to unauthorised persons.

(3) A person shall not tamper with or otherwise interfere with machinery which is installed or being installed in the mine, unless that person is authorised to do so.

#### **Regulation 295—Repairing, lubrication of machinery in motion**

The engineering manager of a mine shall ensure that,

(a) repairs, adjusting, cleaning or lubrication of machinery in the mine, where the machinery is in motion is undertaken only

(i) where there is a risk of personal injury and it is impracticable to stop the machinery, and

(ii) by a competent person, and

(b) automatic devices are used for the lubrication of machinery in motion where practicable.

#### **Regulation 296—Belt-driven machinery**

The engineering manager of a mine shall in relation to that mine ensure that

(a) where it is necessary to stop and start belt-driven machinery without interfering with the speed of the prime mover a suitable appliance for the purpose is permanently fitted; and

(b) where machinery is in motion the driving belt is not shipped or unshipped but the customary shifting of light belts on the cone pulley of machine tools for the purpose of altering the working speed is permitted.

### **Regulation 297—Loose outer clothing not allowed in proximity of machines**

A person in close proximity to a moving machinery in a mine shall not wear loose outer clothing and the engineering manager of a mine shall ensure that loose outer clothing is not worn in close proximity to any moving machinery in the mine.

### **Regulation 298—Personal protective equipment to be provided**

The manager of a mine shall ensure that

- (a) suitable goggles, face masks or screens are provided to protect the eyes of operators, and of any other person in the mine who without the use of these protective equipment, is likely to be exposed to danger, and
- (b) the protective equipment is used when
  - (i) the surfaces of metal, stone, concrete or similar materials are being ground by means of a power driven wheel or disc;
  - (ii) painted or corroded metal surfaces are being chipped or sealed or being mechanically wire-brushed;
  - (iii) metals are being welded or cut by means of electrical, oxy-acetylene or similar processes; or
  - (iv) stone, metal, concrete, slag or similar material is being treated and there is the likelihood of danger to the eyes.

### **Regulation 299—Safety tags and locks**

The engineering manager of a mine shall in relation to the mine

- (a) cause to be designed safety tags to warn personnel of a defect in an appliance, system or machine and the prescriptions of the safety tags shall be strictly adhered to;
- (b) ensure that specific tag out procedures apply to different machinery, but the following are generally observed:
  - (i) where a motor or a part of a moving machinery is to be worked on, the person responsible for the job shall isolate the machinery from the power supply, lock out and tag the machinery at the control device and keep the key;
  - (ii) a person working on a motor or a part of a moving machine shall put that person's personal tag on the machine and shall remove the tag only when that person has finished working;
  - (iii) the lock and tag shall not be removed by any person other than the person who fixed the lock and tag; and
  - (iv) where the job cannot be completed the supervisor shall be informed and the supervisor may ask that the key be kept by the person doing the job or the supervisor may replace the lock with that of the company and tag the lock accordingly;
- (c) ensure that

- (i) each lock used is of good quality and has an individual number;
- (ii) the issuing of locks is documented;
- (iii) only one key is issued to the appropriate person for each lock and a duplicate key is kept under lock and key and only the manager has access to the duplicate key;
- (iv) the engineering manager of the mine shall keep a record of the use of the duplicate key; and
- (v) machinery and installations shall be designed in a manner that enable the main switches to be secured with locks.

### **Regulation 300—Work procedure and work permits for hot works and in restricted areas**

The manager of a mine shall establish for the mine a work procedure for the commencement, execution and termination of works

- (a) in dangerous or restricted areas;
  - (b) in confined spaces;
  - (c) in shafts and on electrical equipment;
  - (d) that involve welding outside a workshop; and
  - (e) where the works could be
    - (i) dangerous for the workers;
    - (ii) damaging to the mine equipment and installations;
    - (iii) dangerous to the public; and
    - (iv) damaging to the environment.
- (2) The work procedure shall be based on a risk assessment and shall describe step by step, activities to be carried out and precautionary measures to be taken in order to reduce the risk of accidents to a minimum level.
- (3) The manager of a mine shall ensure that works in the mine are only commenced after the issuance of a work permit by a competent person who is authorised by the manager of the mine.

### **Regulation 301—Labelling of electrical distribution system and piping network**

- (1) The engineering manager of a mine shall in relation to the mine ensure that
- (a) a centrally located layout plan which indicates main supply and feed lines for the site together with each original source is provided for electrical equipment and installations;
  - (b) the plan lists the main distribution systems and indicates general area distinction and outlets;
  - (c) electrical equipment is labelled as follows:
    - (i) distribution boards shall be labelled in a manner that makes them identifiable on the outside;

- (ii) main switches shall be labelled in accordance with the statutory requirements and be accessible from the outside when the distribution board is locked;
  - (iii) circuit breakers, within the panel shall be labelled in a manner that adequately describes them;
  - (iv) fuses are labelled, and where the board design does not accommodate the labelling of the fuses a legend is attached to the fuses; and
  - (v) corresponding control switches are labelled appropriately;
- (d) the person who carries out the installation of the electrical equipment labels the switches immediately after the installation;
- (e) a piping network in the main distribution system is labelled in the following form:
- (i) critical valves and pipeline valves shall have an appropriate aluminium tag fixed to the valve;
  - (ii) where for security reasons it is undesirable to identify the pipeline contents for general information, a key to codes is left at the main gate for issue to the fire department if they are called to the site;
  - (iii) main valves in pump houses, supply and control feed points for chemicals, gases, and utility lines shall be labelled; and
  - (iv) the direction of flow shall be indicated and shall include ring mains system.

### **Regulation 302—Safety Signs**

The manager of a mine shall post safety signs in the mine to warn, give guidance and protect persons on the site of the mine in areas in which machinery and installations are a source of danger.

### **Regulation 303—Warning signal before starting a machine**

The engineering manager of a mine shall ensure that unless adequate warning is given, a machine in the mine is not started if starting that machine is likely to expose a person to danger.

### Elevators

#### **Regulation 304—Elevators not to be used for transport of persons without permission**

- (1) The manager of a mine shall ensure that except in the case of an authorised person who travels down an elevator for the purpose of examination or repair of the elevator, an elevator is not used for the transport of persons without the permission in writing of the Chief Inspector of Mines.
- (2) The Chief Inspector of Mines may in granting permission under sub-regulation (1), impose restrictions and conditions that the Chief Inspector considers appropriate.



### **Regulation 305—Precautions for safety of persons in vicinity of elevator**

The manager of the mine shall ensure that reasonable precautions are taken for the safety of persons working in the vicinity of an elevator in the mine.

### **Regulation 306—Periodic examination of elevator**

- (1) The engineering manager of a mine shall appoint a competent person to carefully examine
  - (a) at least once each day, the engine or motor of each elevator in the mine and the drum, sheaves and other safety appliances of the elevator;
  - (b) at least twice in each week, the guides and ropes of each elevator in the mine; and
  - (c) at least once in each month each entire elevator plant in the mine and all fittings and appliances of the elevator.
- (2) The engineering manager of the mine shall record without delay the report of the examinations in a book specially set aside for that purpose and the book shall, at all times, be open for inspection.
- (3) The engineering manager of the mine shall take immediate steps to rectify any defects that may be detected by the examination.

### **Regulation 307—Locking doors of entrances to hatchway**

The manager of a mine shall provide entrances to hatchways in the mine with substantial doors or gates, which shall be kept closed and locked except when in actual use.

### **Regulation 308—Construction and safety catches of elevator car**

The manager of a mine shall ensure that an elevator car in the mine is

- (a) of substantial construction and provided with efficient safety catches; and
- (b) fitted with a gate or bar to prevent goods from falling out.

### Lifting machines

### **Regulation 309—General provisions of lifting machines**

- (1) The engineering manager of a mine shall ensure that a lifting machine or lifting tackle is not used in the mine unless the machine or tackle
  - (a) is of good construction, made of sound material, has adequate strength and is free from any visual defect;
  - (b) is used in a manner that ensures that the safety of persons near the machine or tackle is not endangered;
  - (c) is provided where practicable, with a

(i) brake or other device which automatically prevents the inadvertent downward movement of the load when the raising effort is removed; and

(ii) limiting device which will cut off automatically the power when the load reaches its highest working position; and

(d) is clearly and conspicuously marked with the maximum load it is designed to safely carry;

(2) The engineering manager of a mine shall ensure that where the load of the machine or tackle varies with conditions of use including the varying angle of the jib, a table that shows the maximum load for every variable condition is posted in a conspicuous place which is easily visible to the operator but in the case of jib cranes, tower cranes and similar lifting machines or tackle.

(3) The Chief Inspector may require the installation and use of visual or auditory safe-load indicator or both.

### **Regulation 310—Lifting machines to be erected or dismantled under supervision of competent person**

The manager of a mine shall ensure that a lifting machine is not

(a) erected or dismantled in the mine unless under the supervision of a competent person; and

(b) used for the first time in the mine, unless it has been proof load tested and thoroughly examined by a competent person.

### **Regulation 311—Examination of lifting machines by competent person**

(1) The manager of a mine shall appoint for the mine a competent person to thoroughly examine at intervals of not more than twelve months, the parts and working gear whether fixed or movable including the anchoring and fixing appliances of a crane, grab or winch operated by mechanical power and used as a lifting machine in the mine.

(2) The manager of a mine shall ensure that

(a) except in the case of a new machine, a crane, grab or winch which is operated by mechanical power and which has been dismantled or out of regular use for a period that exceeds two months, is not used as a lifting machine in the mine, for the first time unless immediately before the first use the parts and working gear of that lifting machine, whether fixed or movable including the anchoring and fixing appliances have been thoroughly examined by a competent person appointed for that purpose; and

(b) records of the examinations are entered and signed and kept in the mine.

### **Regulation 312—Design of controls of lifting machines to prevent accidental operation**

The engineering manager of a mine shall ensure that the controls of any lifting machine which is used in the mine are suitably placed and constructed in a manner that prevents accidental or inadvertent operations of those controls.

**Regulation 313—Suitable diameter of drum or pulley**

The engineering manager of a mine shall ensure that a drum or pulley around which the chain or wire rope of a lifting machine used in the mine is carried is of suitable diameter and construction for the chain or rope used on that drum or pulley.

**Regulation 314—Three last turns to remain on a winding drum**

The engineering manager of a mine shall ensure that a chain or rope which terminates at the winding drum of any lifting machine is properly secured to the winding drum and at least three turns of the chain or rope remains on the drum in every operating position of the machine, except where the design of the machine permits less than three turns.

**Regulation 315—No unattended load permitted from any lifting machine**

The engineering manager of a mine shall ensure that load is not suspended from a lifting machine used in the mine, if the lifting machine is unattended and is likely to be a source of danger to any person.

**Regulation 316—Person not allowed to be carried by lifting machine**

(1) The manager of a mine shall ensure that a person is not raised, lowered or carried by any lifting machine used in the mine, except written permission has been obtained from the Chief Inspector of Mines.

(2) A permission granted by the Chief Inspector under-subregulation (1) may be subject to conditions determined by the Chief Inspector.

(3) Despite sub-regulation (1), a person may be raised or lowered within the safe limits of the appliance for the sole purpose of making a working place safe.

**Regulation 317—Safety factors for cranes**

The engineering manager of a mine shall ensure that in the mine

- (a) power driven mobile crane used, or
- (b) any other crane used for grabbing duties

is constructed in a manner that enables the crane to hold without overturning a sustained load which, is not less than one and half times the weight of the safe working load for ordinary lifting duty when the crane is standing on level ground.

**Regulation 318—Lifting machines to be operated by or under supervision of competent person**

The manager of a mine shall ensure that a lifting machine in the mine is only operated

- (a) by a competent person, or

(b) for the purpose of training by a person under the direct supervision of a competent person.

**Regulation 319—Signals for lifting machines**

The engineering manager of a mine shall ensure that in the mine any signal given for the movement or stopping of a lifting machine is distinctive in character and is of a nature that ensures that the person to whom it is given is able to see or hear the signal distinctly.

**Regulation 320—Persons to observe safety distance to working lifting machines**

A person in a mine shall not work on or near, or instruct another person in the mine to work on or near, a wheel track of a travelling lifting machine or in a place where that person or that other person is likely to sustain injury by the passage of the lifting machine unless adequate precautions are taken to ensure the safety of that person or that other person.

**Regulation 321—Load to be adequately secured**

The engineering manager of a mine shall ensure that every part of a load is adequately secured while the load is being raised, lowered or transported by a lifting machine in the mine.

**Regulation 322—Containers to be designed to prevent spillage**

The engineering manager of a mine shall ensure that in the mine, except in the case of a grab, shovel, or similar excavating equipment for which adequate precautions have been taken to ensure the safety of persons, a container which is used for raising or lowering material is designed in a manner that prevents spillage.

**Regulation 323—Register for lifting machines**

The engineering manager of a mine shall ensure that there is maintained for the mine a record showing the condition and location of each lifting machine with a safe working load in excess of one thousand kilograms.

**Regulation 324—Hooks**

The engineering manager of a mine shall ensure that each hook used for the lifting of loads in the mine is designed and proportioned in a manner, or provided with a device that completely prevents accidental disconnection of the load.

**Regulation 325—First examination of chains and ropes**

The engineering manager of a mine shall ensure that

- (a) a chain is not used in the mine for the first time unless that chain has been examined and tested by a competent person;
- (b) a wire rope sling with a safe working load exceeding one thousand kilograms is not used in the mine for the first time unless that wire rope has been thoroughly examined by a competent person; and
- (c) a record is kept for the examination and testing conducted under this regulation.

**Regulation 326—Use of defective ropes, chains or slings prohibited**

- (1) A person in a mine shall not use, permit or instruct another person in the mine to use a rope, chain or sling which is defective.
- (2) The engineering manager of a mine shall destroy a rope, chain or sling immediately that rope, chain or sling is found to be defective and that rope, chain or sling shall be replaced by the engineering manager.

**Regulation 327—Warning device on specific lifting machines**

The engineering manager of a mine shall ensure that each lifting machine in the mine on which an operator travels is fitted with an effective audible warning device.

**Regulation 328—Lifting appliances**

The manager of a mine shall ensure that

- (a) a lifting appliance is not used in the mine
  - (i) on a soft or uneven surface, or on a slope, in circumstances in which the stability of the appliance is likely to be affected unless adequate precautions are taken to ensure the stability of the lifting appliance; or
  - (ii) unless it is securely anchored or adequately weighted by suitable ballast properly placed to ensure the stability of the lifting appliance; and
- (b) an overhead track on which a travelling lifting machine moves is provided with effective stops at its ends.

**Regulation 329—Platforms for the operation of lifting appliances**

The engineering manager of a mine shall ensure that a platform used in the mine for the operation of a lifting appliance is

- (a) of sufficient area for the persons required to work on that platform to work or safety;
- (b) close planked or plated;
- (c) provided with safe means of access; and

(d) provided with guard-rails and toe-boards.

### **Regulation 330—Safe working load to be plainly marked**

(1) The engineering manager of a mine shall ensure that

(a) each crane, grab or winch used at, or forming part of the equipment of the mine is plainly but conspicuously marked with the safe working load of that crane, grab or winch, and

(b) in the case of a jib crane which is constructed in a manner that enables the safe working load to be varied by the raising or lowering of the jib, there is attached to that jib crane, an automatic indicator of safe working loads or a table indicating the safe working loads at corresponding inclinations of the job or corresponding radii of the load.

(2) A person shall not, except for the purpose of a test, load any crane, grab or winch in a mine, beyond the safe working load marked or indicated on the crane, grab or winch.

(3) This regulation does not apply to winding apparatus with which a mine shaft or winze is provided, or to any rope haulage apparatus.

### Aerial ropeways

#### **Regulation 331—Clearance of aerial ropeways**

(1) The manager of a mine shall ensure that except within loading and unloading station limits, or with the permission in writing of the Chief Inspector the minimum distance from the ground of any conveyance on a ropeway in the mine is not less than five metres.

(2) The factors of safety of all parts of an aerial ropeway shall be subject to the approval in writing of the Chief Inspector.

(3) A person shall not travel, instruct or permit another person in the mine to travel on an aerial ropeway except with the permission in writing of the Chief Inspector.

(4) Aerial ropeways may with the prior approval in writing of the Chief Inspector, cross over thoroughfares, roads, railways or tramways.

(5) The approval by the Chief Inspector required under subregulation (2) may be subject to conditions determined by the Chief Inspector.

(6) The manager of a mine shall ensure that a structure or an object is not erected or placed under or within a horizontal distance of seven and a half metres of an aerial ropeway.

### Steam boilers and air receivers

#### **Regulation 332—General provisions for steam boiler**

The engineering manager of a mine shall ensure that each steam boiler in the mine and its fittings and attachments are of good construction, sound material, adequate strength and free from patent defect and is properly maintained.

### **Regulation 333—Safety valves and pressure gauges for steam boiler**

The engineering manager of a mine shall ensure that each steam boiler has attached to it

- (a) two suitable safety valves separate from the incapable of being isolated by any stop-valve and which are adjusted in a manner that prevents the boiler from being worked at a pressure greater than the maximum permissible working pressure and are attached directly to or as close as practicable to the boiler;
- (b) a suitable stop-valve that connect the boiler to the steam pipe;
- (c) a correct steam pressure gauge, connected to the steam space and easily visible to the boiler attendant, and which indicates the pressure of steam in the boiler in kilo Pascals and has marked on it, in a distinctive colour, the maximum permissible working pressure; and
- (d) at least two water guages to show the water level in the boiler and, if the guages are of the glass tubular type, are provided with efficient guards which do not obstruct the reading of the gauges.

### **Regulation 334—safety devices for steam boiler**

The engineering manager of a mine shall ensure that each steam boiler is provided with

- (a) a means of attaching a test pressure gauge, and
- (b) a suitable fusible plug or an efficient low-water alarm device.

### **Regulation 335—Precautions before opening steam boiler**

The manager of a mine shall ensure that where a steam boiler is being emptied and opened for cleaning, for repairs, or for any other purpose in the mine, and while the cleaning or repairs is in progress, special precautions are taken to ensure the safety of persons employed in the cleaning or repairs or who may be in the vicinity of the boiler.

### **Regulation 336—Examination of steam boiler**

The manager of a mine shall ensure that

- (a) each steam boiler and all its fittings and attachments are thoroughly examined by a competent person
  - (i) at least once in every period of twelve months; and
  - (ii) after any extensive repairs, when the boiler is cold and when the boiler is under normal steam pressure;
- (b) each steam boiler is tested by water pressure at least once in every twenty-four months,
  - (i) at the hydraulic testing pressure of five hundred and twenty kilo Pascal above the maximum permissible working pressure in a boiler in which the maximum permissible working pressure exceeds five hundred and twenty kilo Pascal, and

- (ii) at double the maximum permissible working pressure in the case of a boiler in which the maximum permissible working pressure does not exceed five hundred and twenty kilo Pascal;
- (c) a report of the result of each examination and test is entered in the Boiler Record Book kept at the mine specially for that purpose, and signed by the person who made the examination or test; and
- (d) the Boiler Record Book is open for inspection by an inspector.

#### **Regulation 337—Examination of used steam boiler**

The engineering manager of a mine shall ensure that, a steam boiler which has previously been used is not used in the mine, for the first time unless it has been examined, tested, and the report on the result of the examination and test is entered in accordance with regulation 336.

#### **Regulation 338—Manufacturer's certificate for new steam boiler**

The manager of a mine shall ensure that

- (a) a new steam boiler is not used in the mine, unless there has been obtained from the manufacturer of the boiler a certificate that specifies the maximum permissible working pressure of the boiler, and states the nature of the tests to which the boiler and fittings have been subjected; and
- (b) the certificate is made available for inspection by an inspector, and the boiler is marked in a manner that enables it to be identified as the boiler to which the certificate relates.

#### **Regulation 339—Notice of use of steam boiler**

The manager of a mine shall give written notice to the Chief Inspector of Mines before any steam boiler is used for the first time in the mine.

#### **Regulation 340—Inspection of steam boiler**

- (1) An inspector may periodically examine steam boilers externally and internally and shall carry out tests that are necessary for the purpose of the examination.
- (2) The manager of a mine shall ensure that the parts of a boiler are thoroughly cleaned and prepared for inspection or for water test as the case may be, in accordance with instructions given by the inspector.

#### **Regulation 341—Record book for steam boiler**

- (1) The manager of a mine shall in relation to that mine keep and maintain a Boiler Record Book which shall contain the details of the history of each boiler in the mine and other records required by these Regulations.



(2) The dates on which a steam boiler in the mine is cleaned or examined, and the condition of the boiler at the examination, and a full report of any alterations or repairs to the boiler, shall be entered without delay in the Boiler Record Book.

(3) The Boiler Record Book shall be signed by the person responsible for any work done on the boiler and each entry shall be initialled by the manager or the representative of the manager.

#### **Regulation 342—Notice before start of repair of steam boiler**

The engineering manager of a mine shall give written notice to the inspector when important repairs are to be executed on the boiler.

#### **Regulation 343—General provisions for air receiver**

The engineering manager of a mine shall ensure that each

(a) air receiver in the mine is marked in a manner that makes the mark clearly visible with the year of manufacture and the authorised working pressure of that air receiver;

(b) air receiver used for the storage of air or gas;

(i) is of sound construction and properly maintained to the satisfaction of the inspector, and

(ii) is where required by the inspector fitted with an apparatus for showing the pressure of the air or gas contained in it, and

(iii) is fitted with a safety valve and where there is no receiver on the surface, the pressure gauge and safety valve are where appropriate fitted to the pipe conveying the air or gas.

#### **Regulation 344—Testing air receiver**

The engineering manager shall ensure that receivers are tested at intervals not exceeding two years and that the test is by hydraulic pressure to the extent of one and one-third of the working pressure over a period to be determined by the inspector.

#### **Regulation 345—Records of tests of air receiver**

(1) The manager of a mine shall in relation to that mine keep and maintain a Compressor Record Book which shall contain the details of the history of each air receiver in the mine and other information required by these Regulations.

(2) A written record of the test conducted on each receiver shall be entered in the Compressor Record Book and signed by the person who conducted the test.

(3) The Compressor Record Book shall be kept by the manager of the mine and shall be opened for inspection by an inspector.

### **Regulation 346—Inspection of air plant and record of inspections**

The engineering manager of a mine shall ensure that

- (a) each compressed air receiver or intercooler and its connection to an air cylinder, from which a discharge results or which is likely to result in the contents being inhaled by a person in or close to the mine is
  - (i) kept clear and free of carbonised oil and other material liable to ignition and
  - (ii) opened and examined by a duly authorised person at intervals of not more than three months;
- (b) a written record and date of each inspection is made in the Compressor Record Book, and signed by the person who conducted the inspection; and
- (c) other types of receivers are opened and examined as provided for in paragraph (a) at intervals of not more than twelve months.

### **Regulation 347—Supply of air for compressors**

The engineering manager of a mine shall ensure that the supply of air for an air compressor in the mine is drawn from the purest and coolest source available.

### **Regulation 348—Fusible plugs and thermometers**

- (1) Where required by an inspector, the manager of a mine shall ensure that in the mine, suitable fusible plugs as well as thermometers or pyrometers which have indications which can be clearly read, are fitted
  - (a) close to the outlet valves or the discharge pipes from air cylinders; and
  - (b) on the outlet pipes of intercoolers of air compressors when operating in combination with a receiver.
- (2) The engineering manager of a mine shall
  - (a) ensure that the highest temperatures allowed in the mine are indicated by red marks on a scale on the thermometer or the pyrometer; and
  - (b) make the attendant in charge of outlet valves or discharge or outlet pipes responsible for
    - (i) ensuring that the temperature limits of the mine are not exceeded; and
    - (ii) recording the thermometer or pyrometer readings at least once during each shift.

### **Regulation 349—Shell of air receiver to be visible for external inspection**

The engineering manager of a mine shall ensure that each air receiver in the mine is mounted in a manner that enables the shell to be visible for external inspection at all times and that provision is made for the free expansion of the shell under all conditions of temperature.

### **Regulation 350—Safety devices of air receiver**

The engineering manager of a mine shall, in relation to that mine, ensure that

- (a) each air receiver has at least one reliable safety valve which is loaded in a manner that enables it to lift when the authorised pressure is exceeded;
- (b) the area available for discharge of air is of a nature that prevents accumulation of pressure greater than ten per cent above the authorised working pressure;
- (c) adequate precautions are taken to ensure that the load setting of each safety valve cannot be altered by an unauthorised person;
- (d) a stop valve is placed between a safety valve and a receiver which that safety valve serves;
- (e) where a safety valve is loaded by a weight or a spring acting on a lever, the load acts only at the extreme end of the lever;
- (f) each safety valve is constructed in a manner that enables it to rotate on its seat; and
- (g) each air compressor, other than an air compressor that discharge into an air receiver and cannot be closed off from the air, is provided with a pressure release valve or other automatic device capable of preventing an accumulation of pressure
  - (i) greater than that for which the air compressor was designed or
  - (ii) which is ten per cent above the pressure for which the system into which the air compressor discharges was designed, whichever is the lesser pressure.

### **Regulation 351—Drain valve of air receiver**

The engineering manager of a mine shall ensure that

- (a) each air receiver is provided with at least one drain valve which is arranged such that a person operating it is not exposed to danger from the discharge from that drain valve; and
- (b) each air receiver in the mine is drained with sufficient frequency to ensure that no dangerous amount of water or sludge is allowed to accumulate.

## Electrical systems

### **Regulation 352—Competent electrical engineer**

The manager of a mine shall ensure that before an electrical apparatus is used in the mine, at least one competent electrical engineer is appointed for the mine in accordance with regulation 50 to supervise the operation of the electrical apparatus, and the appointment shall be in writing.

### **Regulation 353—Manager to ensure good conditions of electrical apparatus**

The engineering manager of a mine shall ensure that

- (a) electrical apparatus in the mine is of good construction, made of suitable material, has adequate strength, is free from patent and any other defect and is properly maintained; and
- (b) in any place in the mine where an installed electrical apparatus is likely to constitute danger to persons, the apparatus is adequately fenced off or effectively enclosed.

**Regulation 354—Annual examination of electrical systems**

The engineering manager of a mine shall

- (a) ensure that
  - (i) there is a thorough examination of the entire electrical distribution system and the electrical equipment at least once in each year;
  - (ii) earth conductivity tests are conducted at least once in each year on all earthing systems in the mine; and
  - (iii) ground resistance tests of all main substations in the mine are conducted at least once in each year; and
- (b) keep records of the examinations and tests prescribed in regulation 355 and make those records readily available for inspection by an inspector.

**Regulation 355—Scheme for installation, use and examination of electrical apparatus**

- (1) The manager of a mine shall formulate a scheme with respect to the installation, re-installation and use of electrical apparatus in the mine.
- (2) The scheme shall provide among others for
  - (a) examination and testing of electrical equipment before the equipment is energized after installation or re-installation;
  - (b) systematic examination and testing of all electrical apparatus to ensure proper maintenance of the apparatus;
  - (c) the nature of the examination and testing to be carried out;
  - (d) the procedure to be followed and precautions to be taken to ensure the safety of persons working on an electrical apparatus; and
  - (e) the identification of installations and the recording of the results of examinations and tests.
- (3) The manager of a mine shall ensure that
  - (a) electrical systems in the mine are labelled according to regulation 301;
  - (b) safety signs according to regulation 302 are posted; and
  - (c) records of examinations and tests prescribed in subregulations (1) and (2) are maintained for a period of five years.

### **Regulation 356—Notice of electrical installations**

The manager of a mine shall send to the Chief Inspector for approval

- (a) particulars of proposed major installation before any electrical apparatus is installed in the mine; and
- (b) particulars of proposed alteration or addition before undertaking any major alteration or major addition to any existing or future electrical installation in the mine.

### **Regulation 357—Plans of electrical apparatus operating at a voltage in excess of 220 V**

(1) The engineering manager of a mine shall ensure that where an electrical apparatus operating at a voltage in excess of two hundred and twenty volts, is installed in the mine there is kept

- (a) at the appropriate office in the mine, plans or distribution diagrams showing the general electrical arrangements for all the apparatus; and
- (b) at each main sub-station accurate distribution diagrams showing the electrical arrangements of each main circuit immediately associated with the sub-station switchgear.

(2) The engineering manager of the mine shall ensure that the sub-station switchgear is adequately labelled and the plans are kept up to date and open for inspection.

### **Regulation 358—Switchgear and cable connections to be protected**

The engineering manager of a mine shall ensure that a switchgear and terminals, cable ends, cable joints and connections of equipment in the mine are constructed and installed and live parts are protected and enclosed in a manner that prevents accidental contact with persons in the mine and danger from electrical faults, arcs, fire, and water and to the satisfaction of the inspector.

### **Regulation 359—Use of electrical equipment**

(1) The manager of a mine shall ensure that

- (a) electrical equipment and conductors in the mine are sufficient in size and strength for the purpose for which they are intended and are selected, arranged, installed, protected, worked and maintained in a manner that prevents danger as far as is reasonably practicable; and
- (b) a person does not operate an electrical equipment, in the mine unless that person has been instructed in the use of that equipment and that person has been duly authorized to use the equipment.

(2) A person who operates a portable electrical machine in a mine shall

- (a) carefully inspect the machine and the flexible cable attached to the machine prior to operating the machine;
- (b) on observing any defect has been rectified; and

(c) ensure that the electric current is cut off from the flexible cable and machine before leaving the workplace.

(3) The engineering manager of a mine shall take the steps that are necessary to ensure that in the mine

(a) the current is switched off from all conductors and equipment which are not in use;

(b) work is not undertaken on any live conductor or live part of equipment;

(c) where an equipment to be worked on is required to be live for the purpose of examination, adjustment, testing, repair or other work, the work may only be undertaken by a person

(i) duly authorized to do that work, and

(ii) using the appropriate tools and protective equipment;

(d) an insulating material is used only if that material is suitable for the purpose for which it is used;

(e) provision is made to confine safely oil or other fluid which may escape from electrical equipment; and

(f) as far as is practicable, a metal ladder or a ladder with metal reinforced tiles is used for examination, repair or other work on an electrical equipment or for work which requires a dangerous approach.

#### **Regulation 360—Faulty electrical equipment**

The engineering manager of a mine shall establish procedures that ensure that

(a) an employee, or another person in the mine immediately reports to a responsible person any defect in electrical equipment in that mine, which that employee or other person is aware of and which to that employee's or other person's knowledge may render that equipment unsafe; and

(b) faulty electrical equipment are disconnected completely from power supply, locked at the switchgear and tagged "faulty-out of order"

#### **Regulation 361—Examination and repairs**

The engineering manager of a mine shall ensure that in the mine

(a) an examination, repair or alteration which requires the handling of electrical equipment is not carried out whilst the equipment is live and that the provisions of regulation 299 are observed;

(b) where work is being carried out on an electrical equipment which was been disconnected from all sources of supply, adequate precautions is taken by earthing or other means to

(i) discharge electrically the electrical equipment or adjacent electrical equipment if there is a danger from that equipment, before that equipment is handled, and

(ii) to prevent any conductor or electrical equipment from being accidentally electrically charge whilst a person is working on that equipment;

(c) switches controlling electrical equipment or conductors are locked and tagged in the open position in accordance with regulation 299, while work is being done on the equipment or conductor; and

(d) adequate facilities, working space and access to that space are provided to ensure that a person undertaking electrical work in the mine is able to work in a manner that prevents that person, as far as is practicable, from being exposed to hazards.

### **Regulation 362—Electrical control gear**

(1) The engineering manager of a mine shall ensure that

(a) an electrical installation and power line in the mine are provided with adequate protective devices and controlling equipment which, automatically isolate the power supply in the event of a fault developing on the installation or power line;

(b) a switchgear used in the mine is designed in a manner that prevents it from being closed accidentally by gravity, impact or any other cause and is provided with a cover to prevent accidental contact with live parts; and

(c) controlling equipment used in the mine is marked or labelled prominently so as to identify the system or part of the system or the electrical machinery which that equipment controls.

(2) The engineering manager of a mine shall ensure that in the mine

(a) a passageway which is not less than two metres wide is provided in front of each switchboard in each generating station on electrical switch room mine;

(b) a portion of a switchboard or any of the attachments of a switchboard is not less than seven hundred and fifty millimetres from any wall if there are connections at the back of the switchboard;

(c) the space between the switchboard and any wall is firmly and evenly floored and except in the case of a low-voltage switchboard, is accessible from each end through a door secured with a lock that may be opened from inside without the use of a key and is not

(i) used as a store room or lumber room;

(ii) obstructed in any way; or,

(iii) crossed by a cable except below the floor or at a height above the floor of not less than two and a quarter metres;

(d) where the supply of electricity is at a voltage that exceeds the limits of low voltage;

(i) a live metal work is not placed in front of the main switchboard within two and a half metres of the floor or platform and the space provided under sub-regulation (3) is not less than two and a quarter metres in the clear; and

(ii) a switch-gear does not contain oil;

(e) circuit breakers are arranged in a manner that ensures that when the contact levers open outwards there is no danger of their striking a person attending to them;

(f) each fuse and each automatic circuit breaker is constructed in a manner that effectually interrupts the current where

(i) a short circuit occurs; or

(ii) the current passing through the fuse or circuit-breaker exceeds by two hundred per cent the working current of the motors or, one hundred per cent the maximum current of the cables which the fuse or automatic circuit-breaker protects and which is permitted under these Regulations;

(g) each fuse at the mine is stamped, marked or labelled in a manner that indicates the current at which it is intended to fuse;

(h) each coil of fuse wire is stamped, marked or labelled in a manner that indicates the current at which it is intended to fuse; and

(i) a fuse, circuit breaker or other protection device is not adjusted or replaced except by an authorised competent person.

(4) The engineering manager of a mine and the person in charge of a generator station or electrical switch room in the mine shall ensure that every opening of a generator circuit breaker or generator fuse in that mine is recorded, by the person in charge of the generator station or machine room where the opening occurs, by entering the fact, date, and time of the occurrence in the registry book and signing the entry.

(5) The engineering manager of a mine shall ensure that in the mine

(a) each sub-circuit is protected by a fuse on each pole, but in the case of the earthed middle wire of a three-wire system the fuses may be on the outers only;

(b) each circuit that has a current of more than five amperes at any voltage not exceeding extra-low voltage, or three Amperes at any voltage above extra-low voltage, is protected by

(i) an automatic maximum current circuit breaker on each pole; or

(ii) a detachable fuse on each pole constructed in a manner that enables it to be removed from a live circuit with a minimum risk of shock;

(c) where necessary and to the extent practicable, and so that an employees is not exposed to hazards, the electricity supply to an item of plant or equipment is capable of being interrupted from a position remote from the item of plant or equipment; and

(d) a person does not interfere with or render ineffective any protective device.

### **Regulation 363—Motors**

The engineering manager of a mine shall ensure that in the mine

(a) each motor together with its starting resistance, is protected by

(i) a fuse or a circuit breaker constructed in accordance with paragraph (b); and

(ii) self-latching switches fixed in a convenient position near the motor and capable of entirely cutting off the voltage;



- (b) each motor of thirty kilowatts or over in a machine room underground is provided with a suitable ammeter to indicate the load on the machine;
- (c) the frames and bedplates of motors other than portable motors, are efficiently is used exceeds the limit of extra-low voltage;
- (d) where any un-armoured cable or wire passes through a metal frame or into a box or motor-casing the aperture in the frame, box or motor-casing is substantially bushed with insulating collars and, where necessary, with gas-tight bushings which cannot readily become displaced; and
- (e) each terminal box of a portable motor in the mine is securely attached to the machine or forms a part of it.

#### **Regulation 364—Insulation of electrical equipment**

The engineering manager of a mine shall ensure that in the mine

- (a) insulation floors are provided for switchboards where a lower or a higher voltage than that required in the mine is used;
- (b) each switch, circuit breaker and fuse complies with the applicable standards or codes of practice prescribed in these Regulations, or with directives issued by the Chief Inspector of Mines;
- (c) each live part of a switch, circuit breaker or fuse in the mine, which is not in a machine room or in a compartment specially arranged for the purpose, is covered with incombustible material, either non-conducting or of rigid metal, clear of all internal mechanism;
- (d) each mains, distribution switchboard and fuse board
  - (i) complies with applicable standards or codes of practice prescribed in these Regulations, or as otherwise directed by the Chief Inspector; and
  - (ii) is fixed in as dry a position as practicable;
- (e) terminals and any live metal on machine underground are protected with insulating covers or metal covers connected to earth where practicable; and
- (f) where the insulation of a motor is found to have become damp during a stoppage, the person in charge of the motor causes the insulation to be thoroughly dried before putting the motor into operation again.

#### **Regulation 365—Electrical equipment to be earthed**

- (1) The engineering manager of a mine shall ensure that in the mine
  - (a) each metallic covering of any cable,
  - (b) the outer conductor of each concentric cable,
  - (c) each metallic part of any covering or container of or mounting for any other electrical equipment, and

(d) each handle for the operation of an electrical equipment, is connected to earth at the surface of the mine in a manner that ensures immediate electrical discharge without danger.

(2) Sub-regulation (1) does not apply to a lamp-holder efficiently protected by a covering made of fire resisting material which is either insulated or earthed.

(3) Without limiting sub-regulation (1), the engineering manager of a mine shall ensure that in the mine, any earthing conductor that is installed has a conductivity throughout including any joint which is not less than half that of the conductor having the greatest current carrying capacity in relation to which it is provided and has a cross-sectional area of not less than sixteen square millimetres except that in the case of

(a) a flexible cable by which electricity is supplied at a voltage not exceeding one hundred and ten watts to a portable equipment, the earthing conductor is not required to have a cross-sectional area greater than six square millimetres, and

(b) a portable equipment at the surface of the mine which has a capacity that does not exceed three kilowatts, and which has a cable comprising an earthing conductor, the earthing conductor is not required to have a cross-sectional area greater than that of any one of the other conductors in that cable.

(4) The engineering manager of a mine shall ensure that in the mine

(a) a switch, fuse or circuit breaker is not placed in any earthing conductor but an isolator may be used in the neutral conductors of an alternator or a transformer;

(b) each earthing system is capable of ensuring

(i) reliable operation of electrical protective systems and devices; and

(ii) adequate protection against contact with conductive parts which have become live under fault conditions;

(c) the frames and bedplates of generators and transformers are efficiently earthed if the voltage at the terminals exceeds the limits of extra-low voltage;

(d) each completely insulated circuit earth or fault detector is kept connected up in each generating and transforming station in a manner that discloses immediately any defect in the insulation of the system;

(e) metal coverings and armour of cables are electrically continuous throughout and efficiently earthed in any case in which the voltage at the terminals where the electricity is used exceeds the limit of extra-low voltage;

(f) each earthing system installed at that mine is connected to the earthing system established at the surface of the mine by means of a continuous earthing conductor;

(g) earthing electrode is not installed;

(h) each single phase alternating current apparatus installed at the mine is supplied from a double insulated, sheeted, portable single phase equipment;

(i) the neutral point of an alternating current electrical system is effectively earthed to the main earthing system; and

(j) an earthing system which incorporates an impedance complies with the requirements for protection against indirect contact set out in any applicable standards that are prescribed in these Regulations, or as otherwise directed by the Chief Inspector of Mines.

#### **Regulation 366—Earth leakage protection**

The engineering manager of a mine shall ensure that in the mine

(a) a suitable method of earth leakage protection is provided for all alternating current circuits except for circuits below extra low voltage;

(b) earth leakage protection equipment

(i) is provided with means by which tests of the operation of the equipment may be made;

(ii) is rated to isolate the power supply at not more than five hundred milli-ampere of leakage current; and

(iii) is provided for a circuit supplying portable apparatus and shall operate at a leakage current not exceeding thirty mill amperes (mA).

#### **Regulation 367—Interference with electrical equipment**

A person shall not wilfully or recklessly damage, or without authority, remove or render useless any electrical safety device or any part of any electrical equipment, electric or machine used in connection with the supply or use of electricity in a mine.

#### **Regulation 368—Unauthorised and unsafe switching and interruption to electricity supply**

A person shall not isolate or restore the electricity supply to all or any part of a mine unless.

(a) that person is authorised by an appropriate person to do so; and

(b) has taken steps to ensure that it is safe to do so.

#### **Regulation 369—Lightning and surge protection**

The engineering manager of a mine shall ensure that in the mine,

(a) suitable equipment is provided to protect electrical installation from abnormal voltage due to atmospheric electric discharges and switching surges;

(b) installations, buildings and other structures are protected against the effects of lightning; and

(c) efficient lightning arrestors are provided in connection with any overhead transmission line from the generating station to the shaft or mine entrance at the mine.

### **Regulation 370—Conductors**

(1) The engineering manager of a mine shall ensure that electrical conductors or other electrical equipment in the mine are

(a) sufficient in size and have adequate current-carrying capacity for the work they are required to perform;

(b) efficiently covered or safeguarded;

(c) installed, worked and maintained in a manner that enables them to reduce, as far as is practicable, to the minimum any danger from accidental shock or fire or over-heating; and

(d) constructed and worked in a manner that ensure that any rise in temperature due to ordinary working does not damage any insulating material employed in the construction or installation of the conductor or equipment.

(2) The engineering manager of a mine shall ensure that in the mine

(a) the size of any copper conductor used except in the case of overhead wires used on the surface, conforms to

(i) the maximum current of electricity which the conductor is required to transmit;

(ii) the class of insulation which it possesses; and

(iii) the dimensions set out in any applicable standards that are prescribed in these Regulations, or as otherwise directed by the Chief Inspector;

(b) except as otherwise provided in these Regulations, conductors, are continuously covered with insulating material;

(c) each conductor is maintained completely insulated from earth, except that

(i) the concentric system with earthed outer conductor may be used if arrangements are made to ensure that any danger from fire or shock is reduced to a minimum; and

(ii) the neutral point of a polyphase system, and the middle wire of a three-wire continuous-current system, may be earthed at one point;

(d) each conductor, which is not an armoured cable and which is intended for a higher voltage than low voltage is protected with a suitable covering in addition to the proper insulation; and

(e) every precaution is taken to prevent electric signal and telephone wires from coming into contact with other electric conductors, whether insulated or not.

### **Regulation 371—Cables**

The manager of a mine shall ensure that,

(a) cables used in the mine comply with the requirements of the applicable standards prescribed under these Regulations, or with the directions of the Chief Inspector of Mines;

(b) cables in the mine are installed, located and maintained so as

(i) not to obstruct access ways;

(ii) to minimise the risk of damage being caused to the cable; and

(iii) to separate the cable from other services in the mine;

(c) cables installed in a part of the mine where quarrying operations are undertaken, or in an underground mine or on a dredge in the mine, are protected by a metallic or steel wired armoured XLPE or PBC/SWA/PBC covering that

(i) is electrically continuous;

(ii) is connected to earth;

(iii) is protected against corrosion;

(iv) is securely attached to equipment at each end; and

(v) encloses the conductors of the cable including the earthing cable;

(d) cables installed in the ground in the mine which operate at a voltage exceeding extra-low voltage are

(i) installed in accordance with applicable standards prescribed under these Regulations, or with directions issued by the Chief Inspector;

(i) installed with orange cable marker tape;

(iii) where necessary to ensure that, so far as is practicable, persons are not exposed to hazards, installed with surface cable route indicators; and

(iv) where there is a material risk of the cable being disturbed by a man-made ground disturbance or where the cable is located in a traffic area, protected by either steel wire armour, if buried directly in the ground, or a substantial heavy duty wiring enclosure;

(e) excavation work is not carried out in the vicinity of buried cables in the mine unless, prior to the commencement of that work, an assessment is made of the measures that should be employed to ensure that, as far as is practicable, that work does not expose persons to hazards and that work is carried out consistently with those measures;

(f) the exposed ends of cables in the mine, where the cables enter the terminals of switches, fuses or other appliances are protected and finished off in a manner that ensures that

(i) moisture cannot creep along the insulating material within the waterproof sheath; and

(ii) the insulating material, if of an oily nature, cannot leak out of the cable;

(g) small wires for lighting circuits in the mine are appropriately

(i) insulated, encased, protected and fixed; or

(ii) tied or suspended;

(h) metallic pipes used in the mine are electrically continuous and earthed;

(i) separate uncased wires used in the mine are kept at least five centimetres apart and not brought together except at lamps, switches or other fittings;

(j) wires are suspended or fixed using materials designed for that purpose;

(k) each cable used in a shaft is

(i) highly insulated and substantially fixed; and

(ii) where it is not capable of sustaining its own weight, properly supported at intervals varying according to the weight of the cable;

(l) where a cable used in a shaft in the mine is not completely boxed in and protected from any falling material, the cable is placed in a manner that leaves sufficient space between the cable and the side of the shaft that enables the cable to yield to, and lessen, the impact of the falling material;

(m) a cable in a shaft in the mine is not fixed in a winding compartment;

(n) a cable in a drive or road in the mine along which any material is conveyed that cannot be kept at least thirty centimetres from any part of a truck or tram is specially protected;

(o) cables and wires in the mine, unless provided with metallic coverings, are not fixed to walls or timbers by means of metallic fastenings;

(p) where repairs are being carried out or blasting is being done in a drive or road, suitable protection is provided for any cable in the drive or road;

(q) each overhead bare wire on the surface of the mine is

(i) properly secured to insulators;

(ii) except in the case of a wire carrying a voltage that does not exceed low voltage, provided with efficient lightning arrestors; and

(iii) clear of all traffic with a minimum ground clearance which as far as is practicable, minimise hazards and is not less than five and a half metres;

(r) each joint made in any cable at the mine is mechanically and electrically efficient and is suitably soldered where reasonably practicable;

(s) when shot-firing cables or wires are used in the vicinity of power or lighting cables in the mine, every precaution is taken to prevent the shot-firing cables or wires from coming into contact with the lighting or power cables; and

(t) electricity from lighting or power cables in the mine is not used for firing shots.

(2) Paragraph (c) of sub-regulation (1) does not apply to

(a) a trailing or reeling cable;

(b) a cable or conductor energised at a voltage not exceeding extra-low voltage;

(c) a flexible conductor which exceeds three metres in length and which is permanently connected to a portable apparatus;

(d) a cable used in a floating treatment as part of a dredging operation; or

(e) a cable used for telephone or signalling purposes.

(3) The manager of a mine shall ensure that cables that supply electrical power in the mine from surface to underground are fed with electrical voltage not higher than a low voltage except for the purposes of transmission.

### **Regulation 372—Flexible and trailing cables**

The engineering manager of a mine shall ensure that in the mine,

- (a) only a flexible cable or trailing cable is used in connection with the operation of
  - (i) a self-propelled mobile machine;
  - (ii) a movable electrical equipment; or
  - (iii) a portable electrical equipment;
- (b) flexible cable or trailing cable is screened, where necessary, and the screen is earthed;
- (c) at any point where flexible cable is joined to a main cable, a switch is provided to cut off the current from the flexible cable;
- (d) trailing cables to trackless vehicles are protected by a pilot wire and a system of monitoring of the earth continuity that automatically disconnects the electricity supply to a cable if there is a break in the earth conductor; and
- (e) trailing cables to trackless vehicles are examined for mechanical damage monthly and the details of the examination recorded.

### **Regulation 373—Electrical requirements for trackless vehicles**

The engineering manager of a mine shall ensure that in the mine electrical safety devices of trackless equipment including drilling rigs are examined after being relocated from one place to the other and before being put into use.

### **Regulation 374—Permitted voltage**

- (1) The engineering manager of a mine shall ensure that in the mine, electrical voltage higher than a low voltage is not used underground except for the purpose of transmission.
- (2) The restriction imposed by sub-regulation (1) on the use underground of a voltage higher than low voltage does not apply to transformers and induction motors in which the whole of the high voltage circuit is not in linear motion.
- (3) The engineering manager of a mine shall ensure that in the mine
  - (a) high voltage conductors other than overhead lines above ground which form the connections of the transformers or motors referred to in sub-regulation (2) or are otherwise used in connection with the supply are
    - (i) completely enclosed in a strong armouring or metal casing sufficiently connected to earth; or
    - (ii) fixed at such a distance or in a manner that reduces to a minimum any danger from fire or shot;
  - (b) high voltage machines, equipment and lines at the mine are clearly indicated as being of high voltage by the use, at frequent intervals, of
    - (i) the word "HIGH VOLTAGE" in red paint and, where practicable, indicating the voltage level; or

- (ii) some other conspicuous method;
- (c) terminals and live metal on machines over low voltage above ground at the mine are, where practicable, protected by insulating covers or metal covers connected to earth; and
- (d) a portable machines is not used at a voltage higher than a low voltage, unless that machine is designed by the manufacturer to safely operate above that level.

#### **Regulation 375—Transformed energy**

The engineering manager of a mine shall ensure that in the mine, where electrical energy is transformed, suitable provision is made to guard against the danger of a lower voltage equipment becoming accidentally charged above the equipment's normal voltage by leakage from or contact with the high voltage equipment.

#### **Regulation 376—Protection of electrical equipment**

The engineering manager of a mine shall ensure that electrical equipment which exceeds extra low voltage has an enclosure, shield, automatic disconnection device or other device or feature that prevents a person from inadvertently coming into contact with live parts of the equipment.

#### **Regulation 377—Switchgear and transformer premises**

The engineering manager of a mine shall ensure that in the mine,

- (a) enclosed premises which house switchgear or transformer are
  - (i) of a size adequate to provide safe working space for operating and maintenance staff;
  - (ii) constructed in a manner that ensures that a person cannot reach in and touch bare conductors or exposed live parts of the electrical machinery;
  - (iii) sufficiently ventilated to maintain the equipment at a safe working temperature;
  - (iv) where necessary, provided with lighting that enables equipment, thoroughfares and working areas to be clearly distinguished and instruments, labels and notices to be easily read;
  - (v) provided with unobstructed doors or gates which open outwards; and
  - (vi) as far as is practicable, constructed in a manner that provides protection against rodents, leakage, seepage and flooding; and
- (b) a person other than an authorized person is not permitted to enter premises housing a switchgear or transformer.

#### **Regulation 378—Notices to be posted**

The manager of a mine shall ensure that in the mine, the following notices, which shall be clearly legible and constructed of durable material, are posted at suitable places within electrical generating



stations, winding engine rooms, main sub-stations and pump stations, and elsewhere as are necessary to minimise danger:

- (a) a notice that warns persons of the proximity or presence of dangerous electrical equipment;
- (b) a notice that prohibits unauthorised persons from entering, operating or interfering with electrical equipment of any description;
- (c) a notice in the form of an illustrated chart that explains the treatment of electrical shock;
- (d) a notice that contains directions on the procedure in case of fire; and
- (e) a notice that mandates the use of appropriate tools and protective equipment as required during the use, maintenance or examination of electrical equipment.

### **Regulation 379—Generating plants and sub-stations to be adequately fenced off or enclosed**

The manager of a mine shall ensure that in the mine, each electricity generating plant and main sub-station equipment is adequately fenced off or enclosed and notices prohibiting unauthorised persons from entering are placed at all designated places of entry and when the plant or equipment is unattended, by an authorised person, designated places of entry are kept closed and locked to prevent unlawful access.

### **Regulation 380—Trolley lines**

The engineering manager of a mine shall ensure that in the mine

- (a) suitable insulated trolley line conductors are provided and arranged in a manner that prevents persons from inadvertently coming into contact with the current-carrying parts and are properly maintained throughout the length of any trolley line conductor;
- (b) trolley line conductors are installed at a height in excess of two and a half metres above the rail at any place where,
  - (i) loading or unloading of vehicles is regularly carried out; and
  - (ii) maintenance or repair of locomotives or other rolling stock is regularly effected;
- (c) effective means are provided for cutting off the supply of electricity of the trolley line conductor system to any section on the same level, and that the section being so controlled does not exceed an installed length of one thousand metres,
- (d) effective means are provided by bonding or otherwise to ensure that the track system overrun by locomotives operating from trolley line conductors is continuous throughout, and that the resistance of any joint is not greater than the resistance of ten metres of the track rail;
- (e) reasonable precautions are taken to ensure
  - (i) that a metallic structure or thing in the vicinity of a trolley line conductor does not attain a potential above that of the earth; and
  - (ii) the safety at all times of any persons working or walking in close proximity to a trolley line conductor;

- (f) the supply of electricity is cut off from a trolley line system which is not in use;
- (g) there is provided on an electrically propelled equipment, whether supplied with electricity from a trolley line or storage battery, a device activated by the driver which when released in an emergency automatically disconnects the supply of electricity to the driving motors; and
- (h) control levers of electrically propelled equipment are so arranged that the levers cannot be removed whilst there is supply of electricity to the supply motors.

#### **Regulation 381—Fire prevention in electrical installations**

The engineering manager of a mine shall ensure that in the mine,

- (a) the supports for electrical equipment and the compartments in which the equipment is installed is made of material and arranged in a manner that reduces the potential for a fire to a minimum;
- (b) flammable material is not stored or placed in the same compartment as electrical equipment;
- (c) a fire extinguishing device is provided in each area where electrical equipment poses a fire hazard; and
- (d) the fire extinguishing device is
  - (i) of a type approved for use on electrical fires;
  - (ii) of a size recommended for the size and type of equipment;
  - (iii) located conveniently to an exit from the area; and
  - (iv) maintained in good condition for immediate use.

#### **Regulation 382—Factors of safety for overhead lines**

(1) The manager of a mine shall ensure that in the mine

- (a) the design of overhead lines comply with the Energy Commission Standards; and
- (b) the respective minimum factors of safety apply to conductors and supports and refer to the breaking load of the conductors.

(2) The minimum factors of safety are subject to the approval in writing, as set out in Form Twenty-Seven in the First Schedule, of the Chief Inspector of Mines.

#### **Regulation 383—Distances from roads and railways of overhead lines**

The manager of a mine may, subject to prior approval in writing of the Chief Inspector and conditions that the Chief Inspector considers necessary, cause overhead lines to be erected along or across thorough-fares, roads, railways, tramways or buildings according to the Energy Commission Standards.

#### **Regulation 384—Distance from explosive magazines of overhead lines**

The manager of a mine shall ensure that except with the prior approval of the Chief Inspector an overhead line in the mine is not erected nearer than eighty metres to any magazine for explosives.

#### **Regulation 385—Clearance of overhead lines**

(1) The manager of a mine shall ensure that in the mine

(a) the minimum vertical height of electrical conductors and other wires from the ground, except in the case of electric trolley wires and service lines for lighting, domestic use and telephones, complies with the Energy Commission Standards;

(b) the minimum clearance requirements for the movement of vehicles and machinery under, and in the vicinity of, overhead power lines take into account the hazards of raised truck trays and raised crane booms; and

(c) the following activities are not carried out in any power line corridor unless the minimum clearances required under sub-regulation (2) is assured:

(i) drilling, excavation, loading, hauling or dumping;

(ii) the construction, fabrication, maintenance or storage of buildings, structures, machinery and equipment; and

(iii) operation of vehicles or machinery with elevating parts that do not afford the required clearance when fully raised.

(2) In sub-regulation (1), "power line corridor" means

(a) the area under an overhead power line that has not been properly isolated; and

(b) the area of ten metres on each side of the area referred to in paragraph (a).

#### **Regulation 386—Design of overhead line**

The manager of a mine shall ensure that each overhead line conductor in the mine is adequately insulated and secured, and every precaution is taken to prevent the conductors from falling away from their supports.

#### **Regulation 387—Breakage of conductors**

The manager of a mine shall institute adequate measures in the mine to render any live conductor dead in the event of that conductor falling due to breakage or otherwise

#### **Regulation 388—Line conductors to be rendered inaccessible**

The manager of a mine shall ensure that a line conductor is rendered inaccessible to a person from a building or any other place without the use of a ladder or other special appliance.

**Regulation 389—Supports of overhead lines**

The manager of a mine shall ensure that all supports in the mine are of substantial construction and comply with the Energy Commission Standards.

**Regulation 390—Service line**

The manager of a mine shall ensure that a service line in the mine is not connected to line conductors at a point of support only and are adequately insulated.

**Regulation 391—Telephone lines**

The manager of a mine shall ensure that a telephone line in the mine is not placed on the same support as other overhead lines, except with the prior approval of the Chief Inspector.

**Regulation 392—Lines crossing other lines**

The manager of a mine shall ensure that an overhead line conductor in the mine does not cross over or under any other line conductor without sufficient precautions being taken to prevent the contact of the conductors.

**Regulation 393—Inspection and maintenance of overhead lines**

The manager of a mine shall ensure that in the mine

(a) each overhead line including its supports and structural parts and electrical appliances and devices belonging to or connected with the line are regularly inspected and efficiently supervised and maintained with regard to electrical and mechanical conditions; and

(b) a structure, machinery, or thing is not erected or placed, under or within a horizontal distance of an overhead line without the prior approval of the Chief Inspector except as prescribed by the Energy Commission Standards.

Winding apparatus and winding engines**Regulation 394—Appointment of Winding Operations Manager**

The engineering manager of an underground mine shall in writing appoint a competent person to manager the winding operations.

**Regulation 395—Approval of installation of winding systems**

(1) The manager of a mine shall ensure that the approval of the Chief Inspection is obtained for the installation of a winding system, or for the transportation of persons or materials, in the mine or for a major modification of the winding system.

- (2) Despite subsection (1) approval is not required for the installation of hoists to be used for
- (a) winze sinking;
  - (b) raising;
  - (c) stope servicing; or
  - (d) any similar purpose.

(3) The manager of a mine shall, for the purpose of obtaining the approval referred to in sub-regulation (1), submit to the Chief Inspector of Mines

- (a) plans showing the layout of the system;
- (b) any information that is necessary to demonstrate that the system will comply with the requirements of these Regulations; and
- (c) any other information required by the Chief Inspector of Mines.

#### **Regulation 396—Approval of components of winding systems**

Where required by the Chief Inspector of Mines by notice in writing, the manager of a mine shall ensure that approval of the Chief Inspector of Mines is obtained for

- (a) the use in the mine of the components of the winding system including winding engines or haulage apparatus as specified in the notice; and
- (b) any repair, modification or alteration of the components of the winding system used in the mine.

#### **Regulation 397—Notice of repairs**

(1) Subject to sub-regulation (3), the manager of a mine shall ensure that the Chief Inspector of Mines is notified of any intention to carry out repair, modification or alteration to a main structure, safety device or other safeguard of a winding engine in the mine and that the notice is accompanied by a description of the work proposed to be undertaken.

(2) A notice under sub-regulation (1) shall, as far as practicable, be given

- (a) not less than fourteen days before the commencement of the relevant work, and
- (b) where the period specified in paragraph (a) is not practicable, as soon as the need to undertake the work becomes apparent.

(3) Where sub-regulation (1) cannot be complied with because of the need to undertake emergency repairs or modifications, the manager of the mine shall give notice to the Chief Inspector as soon as possible after the emergency repairs or modifications have been undertaken.

**Regulation 398—Winding apparatus to be provided with suitable locking device or brake**

The manager of a mine shall ensure that a winding apparatus in use in the mine is provided with a suitable locking device or brake to hold the drum stationary when a fully loaded bucket or kibble or other receptacle is suspended from the winding rope.

**Regulation 399—Brakes, devices, minimum rope and sheaves**

(1) The manager of a mine shall ensure that in the mine,

(a) each drum of a drum shaft on a winding engine is provided with one or more adequate brakes on every drum or drum shaft, and that the brakes are constructed in a manner that enables them to be easily manipulated by the engine driver when that driver is at the levers controlling the engine and that the brakes are kept in proper working order;

(b) the drum of each winding engine has flanges or horns, and where the drum is conical or spiral the drum has other appliances that are sufficient to prevent the rope from slipping off;

(c) there are not less than three rounds of rope on the drum when the cage or skip or other means of conveyance is at the lowest point of the shaft from which hoisting is going on and the end of the rope is where applicable, properly fastened around an arm or the shaft of the drum; and

(d) in the case of an engine where a part of the rope is not rigidly fixed to the drum there is no likelihood of a dangerous slipping or the rope on the drum under any possible working condition.

(2) In this regulation, "drum" and "drum shaft" include sheave and sheave shaft.

(3) Except as otherwise approved by the Chief Inspector of Mines, the manager of a mine shall ensure that the diameter of a drum or of a head sheave used in drum winding operations in the mine is not less than

(a) one hundred times the diameter of the rope, in the case of a locked coil rope; and

(b) eighty times the diameter of the rope, in the case of any other type of rope.

(4) The manager of a mine shall ensure that in the mine

(a) the depth of any rope groove in a head sheave is not less than twice the diameter of the rope; and

(b) each hoist is provided with at least one brake system that

(i) is able to stop safely and hold the shaft conveyance under every condition of loading, direction of travel and speed;

(ii) is automatically applied when the supply of power to the hoist fails or the pressure of any fluid or other medium used as a means of controlling the brake falls below a predetermined level;

(iii) has a brake holding capacity capable of supporting a load that is not less than two times the maximum static load normally hoisted from the lowest operating position in the shaft; and

(iv) has parts that have a factor of safety of not less than ten with screwed members in tension having a safety factor of not less than fifteen.

(5) The operator of a winding engine in the mine shall ensure that the brake of that engine is fully applied when a person is getting on or off the conveyance.

(6) A person shall not by the use of the brake alone lower a winding conveyance in the mine where that conveyance contains a person or material.

(7) A person shall not enter, or allow another person to enter, a cage, skip or kibble in a mine if that cage, skip or kibble is held in place by the brake alone and the clutch of the winder drum is not engaged.

#### **Regulation 400—Single gear drum winding**

The manager of a mine shall ensure that,

(a) where a winding engine used for drum winding operations in the mine is provided with two drums, a shaft conveyance connected to the engine is not used to raise or lower a person if one of the drum is out of gear and loose on the drum shafting on which is out of gear and loose on the drum shafting on which it operates except in a case of emergency; and

(b) where one of the drums of a double drum winding engine in the mine is out of gear, that drum is prevented from revolving.

#### **Regulation 401—Permission required for raising or lowering of persons**

(1) The manager of a mine shall ensure that in the mine a winding engine or apparatus is not used for

(a) raising or lowering persons, or

(b) raising or lowering of rocks, water, tools or other materials where a person is working under or below the engine or apparatus

unless there is written permission from the Chief Inspector of Mines to use the winding engine or apparatus subject to special conditions that the Chief Inspector of Mines considers necessary for the use of the winding engine or apparatus.

(2) The Chief Inspector of Mines shall only grant permission under sub-regulation (1), if the winding engine or winding apparatus is tested to the satisfaction of that Inspector who shall specify the maximum number of persons to be allowed in the conveyance and the maximum allowable winding speed.

(3) The manager of a mine shall ensure that

(a) a notice which shows clearly the number of persons allowed to ride in a conveyance in the mine is posted at each landing place and that the specified maximum number of persons is not exceeded;

(b) the safe speed for winding of men is determined for each shaft, in the mine and is not exceeded; and

(c) a person is not hoisted in the mine at a speed faster than ten metres per second.

#### **Regulation 402—Cast iron drums prohibited**

The manager of a mine shall ensure that cast iron drums are not used in the mine except with the written permission of the Chief Inspector of Mines.

#### **Regulation 403—Manipulation of winder**

(1) The manager of a mine shall ensure that a winding engine that is intended to be used in the mine is constructed in a manner that ensures that

(a) when the winding engine is running at various speeds with light and heavy loads it can be readily slowed and stopped and after stopping can be immediately started again in either direction by the engine driver; and

(b) each winding drum when un-clutched from the engine can be maintained in the position of rest by means of its own brake, with no more slipping than one third of a metre when

(i) bearing its maximum working load, and

(ii) the maximum load is increased to the extent of doubling the authorised load of the case or skip.

(2) In estimating the authorised load in respect of persons carried in a cage or skip seventy five kilograms shall be allotted for each person.

(3) The driver of a winding engine in a mine shall ensure that a cage or skip in which a person is travelling is not accelerated or decelerated by the winding engine at a rate greater than one and a half metres per second per second but in the case of emergency the deceleration shall not be less than two metres per second per second and not more than five metres per second per second.

(4) The manager of a mine shall ensure that where an automatic winding engine is used in the mine, the automatic controls do not allow the winding engine to exceed the rates prescribed in sub-regulation (3).

#### **Regulation 404—Depth and speed indicator**

The manager of a mine shall ensure that in the mine

(a) each engine used in raising or lowering a person or material in a shaft or winze that exceeds thirty metres in depth is provided with a reliable depth indicator, in addition to any marks on the drum, which clearly and accurately show to the engine driver at the driving seat at all times

(i) the position of the case, skip or other means of conveyance in the shaft; and

(ii) at what places in the shaft, changes of gradient necessitate reduction in speed;

(b) except where an exemption is granted by the Chief Inspector of Mines in a special circumstance, a reliable speed indicator is attached to the winding engine;

(c) a winding engine, is not used for winding while a depth or speed indicator is disconnected; and

(d) each electric winding engine is fitted with an ammeter that is maintained in proper working order and which clearly indicates to the driver the level of electric current being drawn by the electric motor driving the winding engine.



#### **Regulation 405—Clutch of winding drums to be provided with locking arrangement**

The manager of a mine shall ensure that in the mine

- (a) the operating mechanism of the clutch of each winding drum is provided with a locking arrangement which is used to prevent inadvertent withdrawal of the clutch; and
- (b) where the clutch is not clearly visible from the driver's operating position, a means is provided to indicate to the driver at all times the extent to which the clutch is engaged or disengaged.

#### **Regulation 406—Opening clutch of winding drum**

The manager of a mine shall ensure that the clutch of any winding drum cannot be engaged if the brakes of the drum are fully applied and that brakes of the drum cannot be released until the clutch is fully engaged and securely locked.

#### **Regulation 407—Over-winding and over-speeding**

- (1) The manager of a mine shall provide a suitable automatic device to prevent over-winding and over-speeding of cages or other conveyances in the mine at each winding shaft or winding engine.
- (2) The automatic device required in subregulation (1), shall be constructed in a manner that
  - (a) prevents the descending cage or other conveyance from being landed at the lowest entrance to, or bottom of, the shaft or winze at a speed exceeding one and a half metres per second;
  - (b) prevents the shaft conveyance from exceeding a speed which is fifteen per cent greater than the approved maximum designed speed;
  - (c) controls the speed of the shaft conveyance in any part of the shaft to conform with predetermined limits; and
  - (d) controls the movement of the ascending cage or other conveyance to prevent danger to any person in the conveyance.
- (3) The manager of a mine shall ensure that in the mine
  - (a) the skip-way on the headgear is carried without any obstruction to a height of at least eight metres above the landing place of persons;
  - (b) where winding is carried out in a shaft or winze there is fitted above the bank spring keps, or some other effective contrivance to support any conveyance in case of an over-wind; and
  - (c) the bottom of a shaft or winze where winding is carried out is kept reasonably free of accumulation of water and an efficient device, approved by the Chief Inspector, is installed to arrest the speed of the descending cage, skip or other conveyance particularly on the occurrence of an over-wind.
- (4) The device required in paragraph (c) of sub-regulation (2), shall be in addition to the automatic device specified in sub-regulation (1).
- (5) The manager of a mine shall ensure that, in respect of each winding engine in the mine, appropriate devices are provided in the shaft head-frame, or tower, to remove power from the

winding engine and by automatic application of the brakes bring the winding drum or driving sheave to rest before any shaft conveyance, counterweight or rope attachment reaches any permanent obstruction to its passage.

(6) The manager of a mine shall ensure that any device provided on a winding engine at the mine to permit backing out from an over-wound position responds to manual control only, and allows withdrawal from the over-wind position only.

## Ropes

### **Regulation 408—Quality of winding ropes**

(1) The manager of a mine shall ensure that in the mine

(a) each rope used for winding purposes in shafts or winzes, except in the case of prospecting shafts which is not more than thirty metres in depth, is made of steel of good quality, free from defect, and the gauge of the wires used in the construction of the rope is suited to the diameter of the sheaves and drums fitted;

(b) the load applied to any rope used for drum winding does not result in a factor of safety which is less than the factor according to the following:

(i) for transport of persons, a safety factor greater than 6;

(ii) for transport of rock or materials a safety factor greater 5.5 - 0.0003D;

(iii) for transport of rock in a shaft used exclusively for the purpose of transporting rock, a safety factor greater than 4.5; and

(iv) for transporting a machine or part of a machine at a speed of less than two metres per second, a safety factor greater than 5.

(2) "D" specified in subparagraph (ii) of paragraph (b) of subregulation (1), is the depth of the shaft in metres.

(3) The Chief Inspector of Mines may by writing vary the requirements of paragraph (b) of subregulation (1), subject to conditions and on terms that the Chief Inspector of Mines considers necessary.

### **Regulation 409—Particulars of new winding ropes**

(1) The manager of a mine shall, at least twenty one days before a new winding rope is used in the mine, submit to the Chief Inspector a certificate from the manufacturer of the rope which sets out

(a) full details of the construction of the rope;

(b) the class of steel used in the construction of the rope; and

(c) the breaking force of the rope

(2) Where the Chief Inspector of Mines has concerns about the authenticity of a certificate submitted under sub-regulation (1), the Chief Inspector of Mines may require a test of the breaking

force of the rope to be undertaken, at a place and in a manner approved by the Chief Inspector of Mines, and

(a) the results of the test shall be submitted to the Chief Inspector of Mines before the rope is used and

(b) the manager shall ensure that this requirement is complied with.

#### **Regulation 410—Examination of new ropes and connecting apparatus**

The manager of a mine shall ensure that in the mine

(a) a winding rope which has been newly attached to a cage, skip or other conveyance and also the connecting apparatus between the rope and the cage, skip or other conveyance is

(i) carefully examined by a competent and reliable person authorised by the manager; and

(ii) not used for the transport of persons in a shaft or winze until it is run on two complete trips up and down the working portion of the shaft or winze, the cage or other means of conveyance attached to the winding rope bearing its authorised load;

(b) non-destructive tests are carried out on newly attached ropes within one week, after the attachment and copies of the tests are submitted to the Chief Inspector of Mines; and

(c) the result of the examination immediately recorded in the Machinery Record Book, kept as provided for in regulation 459, and the Record Book is always kept open for inspection by the Chief Inspector of Mines.

#### **Regulation 411—Records of winding ropes**

(1) The manager of a mine shall ensure that the following records are kept as set out in Form Twenty-Eight in the First Schedule in respect of each winding rope used in the mine:

(a) the certificate number of the rope;

(b) the name of the shaft or winze in which the rope is used;

(c) where applicable, the compartment of the shaft in which the rope is used;

(d) the date on which the rope was put on;

(e) each date on which the rope was shortened and the amount of the shortening on each occasion;

(f) each date on which the rope was re-capped;

(g) each test undertaken of the rope and the results of that test;

(h) each date on which the rope was examined, cleaned and oiled; and

(i) the date upon which the rope was taken out of service.

(2) A person keeping a record under sub-regulation (1) shall ensure that that person's identity and the date on which the record was made is evident from the records.

(3) The manager of a mine shall ensure that the records required to be maintained under this regulation, in respect of a rope, are retained for a period of not less than five years from the date the rope is permanently taken out of service.

#### **Regulation 412—Testing of winding ropes**

- (1) The manager of a mine shall ensure that each rope used on a winding engine drum in the mine
- (a) is recapped at intervals not exceeding six months or any shorter period required by an inspector;
  - (b) has four metres cut from the shaft conveyance or counter-weight end, at intervals of not more than six months, for destructive tensile testing in a manner required by the Chief Inspector; and
  - (c) if required by an inspector, has after its first year of operation a sufficient length cut from the shaft conveyance or counter-weight end to enable a breaking and elongation test to be made of four metres of the rope which has repeatedly passed over the head sheave, and the test is conducted in the manner required by the Chief Inspector.
- (2) The manager of a mine shall ensure that in the mine if there are two or more layers of rope on a winding engine drum, two metres of the rope on the drum are cropped at twelve months intervals at the drum end to ensure that the position of the crossover points of the rope on the drum are changed.
- (3) Except as otherwise approved by the Chief Inspector, the manager of a mine shall ensure that the structure of each drum winding rope in the mine is examined at intervals of not more than six months over its entire working length by a non-destructive method to determine whether there has been any deterioration of the rope.
- (4) The manager of a mine shall ensure that a record is maintained of any examination or test conducted under this regulation, and that the record contains the date on which the examination or test was conducted, the person who conducted the examination or test and the results of the examination or test.
- (5) The manager of a mine shall ensure that the records required to be kept in relation to the mine under subregulation (4) are maintained for five years from the removal of the relevant rope from service.

#### **Regulation 413—Winding ropes to be tested if required by Chief Inspector of Mines**

At the request of the Chief Inspector of Mines, the manager of a mine shall submit an adequate sample of any winding rope for the tests that the Chief Inspector may require.

#### **Regulation 414—Spare ropes to be kept where persons are hoisted**

The manager of a mine shall ensure that in the mine where persons are raised or lowered, at least one spare rope of the type specified in regulation 408 is always kept in reserve, ready for use.

### **Regulation 415—Retirement criteria of winding ropes**

The manager of a mine shall ensure that in the mine unless damage or deterioration is removed by cut-off, wire ropes are removed from service when any of the following conditions occur:

- (a) the number of broken wires within a rope lay length, excluding filler wires, exceed either
  - (i) five percent of the total number of wires; or
  - (ii) fifteen percent of the total number of wires within any strand;
- (b) on a regular lay rope, there is more than one broken wire in the valley between strands in one rope lay length;
- (c) there is a loss of more than one-third of the original diameter of the outer wires;
- (d) there is rope deterioration from corrosion;
- (e) there is distortion of the rope structure;
- (f) there is heat damage from any source;
- (g) there is diameter reduction due to wear that exceeds six percent of the base line diameter measurement;
- (h) there is loss of more than ten percent of the rope's strength as determined by non destructive testing; and
- (i) when the rope reaches the statutory rope life according to regulation 418.

### **Regulation 416—Capping of winding ropes**

(1) The manager of a mine shall, before re-capping a winding rope, complete and submit to the Chief Inspector of a mine, a Winding Rope Re-capped Form as set out in Form Forty-One of the First Schedule.

(2) The manager of a mine shall ensure that in the mine

- (a) the method used for capping a winding rope
  - (i) has been approved by the Chief Inspector of Mines,
  - (ii) is of a proven design that provides a minimum factor of safety of seven when applied to the maximum static load on the capped end of the rope;
- (b) a winding rope which is capped to secure the rope to a shaft conveyance or counterweight by means of a capel or socket is not used unless that capping has been made not more than six months before the date of the use of the winding rope; and
- (c) a rope which has been recapped is not used on a winding engine unless on the last occasion on which it was recapped the capping was moved to a distance of not less than one hundred and fifty millimetres along the rope towards the standing end of the rope.

### **Regulation 417—Cage and skip attachments**

The manager of a mine shall ensure that in the mine, the components of attachments between winding ropes, or balance ropes, and cages, skips, kibbles or counterweights

- (a) comply with standards or codes of practice that are prescribed under these Regulations, or with directives issued by the Chief Inspector;
- (b) do not use a screwed suspension member in tension except for swivels used on balance ropes;
- (c) do not have any main component welded;
- (d) do not use an open hook in hoisting operations;
- (e) except for the initial heat treatment undertaken by the manufacturer, are not subjected to heat treatment; and
- (f) are not used for a period of more than ten years.

(2) The manager of a mine shall ensure that records are kept of all shaft conveyance attachments used in the mine and that the records contain particulars that show

- (a) the shaft or winze in which the attachment is used;
- (b) for multi-rope attachments, the location of the attachment on the conveyance;
- (c) in the case of a shaft, the compartment in which the attachment is used;
- (d) the attachment's identification number;
- (e) the date of installation of the attachment into service;
- (f) each date of examination, cleaning, oiling and testing of the attachment, the results of any examination and testing and the name of the person who undertook the relevant examination, cleaning, oiling or testing; and
- (g) the date of the removal of the attachment from service.

(3) The manager of a mine shall ensure that the records required to be kept under sub-regulation (2) are maintained for five years from the removal of the relevant attachment from service.

### **Regulation 418—Life of rope**

The manager of a mine shall ensure that a winding rope which has been in use for three years is not used for the raising or lowering of persons in the mine, except with the written permission of the Chief Inspector of Mines as set out in Form Twenty-Nine in the First Schedule.

### **Regulation 419—Used ropes prohibited**

The manager of a mine shall ensure that without the approval of an inspector a rope which has previously been used

- (a) in one function is not used in the mine in another function;

or

(b) in another mine, is not used in the mine.

#### **Regulation 420—Spliced ropes prohibited in shafts and winzes**

The manager of a mine shall ensure that in the mine a spliced rope is not used in a shaft or winze.

#### **Regulation 421—Guide ropes to be provided**

(1) The manager of a mine shall ensure that in the mine a vertical shaft exceeding fifty metres in depth is provided with guide ropes for the cage, skip, bucket or other means of conveyance unless the Chief Inspector of Mines grants an exemption as set out in Form Thirty in the First Schedule in writing from this requirement.

(2) The guide ropes shall

(a) in a sinking shaft, allow the cross head to travel to a point not more than eighteen metres from the bottom; or

(b) in any other shaft extend to the lowest point from which winding takes place.

(3) The manager of a mine shall ensure that in the mine,

(a) unless otherwise approved by the Chief Inspector of Mines, guide ropes and rubbing ropes are of locked coil construction;

(b) guide ropes or rubbing ropes are not used until an Inspector has approved in relation to the ropes and the tension weight used with the ropes the

(i) number;

(ii) size;

(iii) length;

(iv) disposition;

(v) method; and,

(vi) the type of attachment; and

(c) each guide rope and rubbing rope has a minimum factor of safety of five.

#### Conveyances

#### **Regulation 422—Conveyances**

(1) The manager of a mine shall ensure that in the mine any conveyance used in winding operations is

(a) not obstructed in its passage in the shaft during operations;

- (b) prevented from colliding with other objects in the shaft during operations; and,
- (c) capable of preventing persons, rock, material and other things from protruding from, or moving in, the conveyance.

(2) The manager of a mine shall submit a weekly shaft examination report as set out in Form Thirty-One of the First Schedule.

**Regulation 423—Secure connection between rope and conveyance**

The manager of a mine shall ensure that in the mine the connection between a rope and cage, skip, bucket or other means of conveyance is of a nature that prevents accidental disconnection from take place and is made in a manner that is approved by an Inspector.

**Regulation 424—Securing of projecting materials during winding**

The manager of a mine shall ensure that in the mine where tools, wood, or other materials are being raised or lowered in a shaft or winze, their ends, if projecting above the top of the cage, skip, bucket, kibble or other conveyance, are securely fastened to the winding rope or to the bow of the conveyance.

**Regulation 425—Restrictions regarding persons allowed to travel with mineral or explosives**

A person in a mine shall not ride in a shaft or winze or on a cage, skip, kibble or other conveyance containing timber, pipes, rails, explosives, ore, waste rock or similar material or tools except where that person is

- (a) travelling in the cage or skip with tools or materials for the purpose of repairing a shaft;
- (b) carrying small tools in a suitable container,
- (c) travelling with the person's instruments;
- (d) a cage tender and is travelling in a cage or skip with tools, explosives or materials; and
- (e) travelling in any other circumstances authorised by the Chief Inspector.

(2) A cage tender shall not

(a) travel in a conveyance which contains material that is not securely fastened or otherwise secure;  
or

(b) travel upwards with drill steel, timber, pipes or similar material.

(3) A person shall not ride in a

(a) deck of a multi-deck cage while a load other than a passenger is on a higher deck; or

(b) shaft conveyance when equipment, long timber, rails or similar material is slung below the conveyance.



(4) The manager of a mine shall ensure that a person does not ride in a conveyance in the mine contrary to this regulation.

#### **Regulation 426—Restrictions regarding man-riding**

(1) Subject to sub-regulation (2), a person shall not ascend or descend a shaft or winze

(a) on the top of a cage or on the side, bow, rim, bail or carriage of a skip, kibble, truck or other means of conveyance, whether loaded or unloaded;

(b) or on top of a loaded or in a partially loaded cage, skip, bucket, kibble, truck or other means of conveyance.

(2) A person engaged in shaft repairs or shaft inspections may ride on top of a cage or on the bridle of a skip.

(3) In the case of a vertical shaft the manager of the mine in which that shaft is located shall ensure that a cover is provided to protect a person engaged in shaft repairs or shaft inspections and that that person is provided with and wears a safety belt or harness effectively secured to prevent that person from falling down the shaft.

#### **Regulation 427—Man-riding in skips**

The manager of a mine shall ensure that in the mine

(a) the relevant winding engine driver is aware at all times when a person is riding in the skip in the mine controlled by that winding engine driver; and

(b) a person is not raised or lowered in an ore skip in a vertical shaft unless

(i) that person stands on the bottom of the skip or on a platform provided in the skip for that purpose; and

(ii) provision is made for the safe entry and exit of that person.

#### **Regulation 428—Acts prohibited while cage is in motion**

(1) A person who travels in a cage or other conveyance in a mine shall not

(a) change that person's position in the cage or conveyance while the cage or conveyance is in motion;

(b) get on or off or attempt to get on or off the cage or other conveyance while the cage or conveyance is in motion; or

(c) smoke while travelling in the cage or other conveyance.

(2) A person shall not ride on a winding rope attached to a cage or other conveyance in a mine

**Regulation 429—Filling, hooking, steadying, stopping and starting of sinking bucket**

- (1) The manager of a mine shall ensure that in the mine,
- (a) in the course of sinking a shaft or a winze, the bucket or other means of conveyance is not filled with loose rock or ground above the level of the brim;
  - (b) before the bucket or other means for conveyance leaves the top or bottom of the shaft or winze it is steadied by or under the supervision of the workman in-charge who shall ensure that the bucket or other means of conveyance is properly hooked on; and
  - (c) the bucket or other means of conveyance is not lowered directly to the bottom of the shaft or winze if men are present there, but is stopped at least five metres above the bottom until the signal to further lower it has been given by one of the sinkers at the bottom.
- (2) Sub-regulation (1) does not apply to shafts or winzes in which the sinkers are not more than fifteen metres from the banksman.

**Regulation 430—Responsibility of manager for transportation of persons in a conveyance**

- (1) The Manager of a mine shall ensure that a written permission of the Chief Inspector of Mines, as required by subregulation (2) of regulation 401, is obtained before a person is raised or lowered in a conveyance in the mine.
- (2) The Manager of a mine shall take steps that are necessary including the appointment of a competent person, to ensure that sub-regulation (3) of regulation 401 which requires the posting of notices at each landing stage to show the maximum number of persons allowed to ride in conveyance is observed.

**Regulation 431—Covers and doors of cages, skips and other conveyances**

- (1) The manager of a mine shall ensure that in the mine,
- (a) a cage, skip or other conveyance used for conveying persons in a vertical or steeply inclined shaft or winze
    - (i) has a proper roof or cover; and
    - (ii) is constructed in a manner that prevents any part of the body of a person riding in the cage, skip or other conveyance from accidentally coming into contact with the timbering or sides of the shaft; and
  - (b) doors to cages are fixed in a manner that ensures that they cannot be accidentally opened.
- (2) The Chief Inspector of Mines may exempt any existing shaft or winze from the provisions of this paragraph under conditions that the Chief Inspector of Mines may specify.
- (3) This regulation does not apply to conveyances used in sinking operations.

### **Regulation 432—Automatic operation of keps**

The manager of a mine shall ensure that where a keps or any other contrivance is used in the mine for the purpose of landing a cage or other conveyance at any point in a shaft or winze, other than at the bank or the lowest point of travel for a skip, the keps or other contrivance is arranged in a manner that ensures that it automatically falls clear and remains clear of the hoisting compartment when the cage or other conveyance is lifted off.

### Repairs

#### **Regulation 433—Winding during repairs**

(1) The manager of a mine shall ensure that except where winding is necessary for the purpose of repairs, examination or other work, the permission in writing of the Chief Inspector of Mines is obtained before winding is permitted in a winding compartment of a shaft or headgear in which persons are engaged in effecting repairs, conducting an examination or doing other necessary work.

(2) This regulation does not prohibit a person, who is adequately protected from conveyances or other winding equipment used in the winding operations as well as from falling stones and falling material, from working.

#### **Regulation 434—Precautions in the case of shaft repairs**

(1) Where a repair, examination or work in connection with the maintenance or installation of equipment in a winding compartment of a shaft or headgear in the mine is to be carried out, the person immediately in charge of the repair, examination or other work shall

(a) give notice to the winding engine driver that the repair, examination or other work is to be undertaken;

(b) make an entry into the shaft log book and winding engine drivers log book to the effect that repair, examination or other work in the shaft is commencing;

(c) take from the winding engine room and carry along the special brass token; and

(d) ensure that signals given to the winding engine driver are preceded by a special signal of "One long bell", which signifies shaft repairs.

(2) The person immediately in charge of the repairs, examination or other work is the only person authorised to give the signal, or to instruct any other person to give the signal, to the winding engine driver while the repair, examination or other work is being undertaken.

(3) A person who is not authorised to give the signal or to instruct a person to give the signal shall not give the signal or authorise another person to give the signal while a shaft repair is in progress or when the brass token is removed from the winding engine room.

#### **Regulation 435—Completion of shaft repairs**

The person immediately in charge of a repair, examination or other work shall, on completion of the repairs, examination or other work in a winding compartment of a shaft or headgear,

- (a) return the brass token to the winding engine room and give notice to the winding engine driver that the work is completed; and
- (b) record the operation in the shaft log book and the winding engine drivers log book.

**Regulation 436—Support of cages during repairs**

The manager of a mine shall ensure that where repairs are made in the mine to the clutches or brakes of a winding engine and where the ropes are attached to the drums, any affected skip, cage or counterweight is removed or firmly supported while the work is in progress.

**Regulation 437—Brass token to be kept in conspicuous place in winding engine room**

The manager of a mine shall ensure that in the mine except where a repair, examination or other work in a winding compartment of a shaft or headgear is being undertaken, the special brass token is kept in a conspicuous place in the winding engine room and in full view of the winding engine driver when the winding engine driver at the levers controlling the engine.

**Regulation 438—Signals when brass token removed**

- (1) Where the brass token is absent from the winding engine room in the mine the winding engine driver shall not set the engine in motion in response to any signal unless the signal is immediately preceded by the special signal of "one long bell".
- (2) The manager of a mine shall ensure that another special signal is not employed in the mine to replace the special signal of "one long bell" unless the replacement is authorised in writing as set out in Form Thirty-Two in the First Schedule by the Chief Inspector of Mines and a copy of the authorisation is posted conspicuously in full view of the winding engine driver, at the shaft collar, and at every station.

**Regulation 439—Precautions to be taken against fire where flame cutting or welding apparatus is used**

- (1) Where oxy-acetylene or other flame cutting or welding apparatus is being used to effect a repair in a shaft or the headgear of a shaft in a mine, the person immediately in charge of the repair shall
  - (a) take precautions against burning material falling down the shaft; and
  - (b) by the use of water or other coolant effectively render the place where the cutting or welding operations are being carried out safe from the hazard of fire.
- (2) The manager of the mine shall ensure that suitable fire extinguishing equipment is provided in the mine and work procedures are in accordance with regulation 525.
- (3) On the completion of the cutting or welding operations, the person immediately in charge of the operations shall
  - (a) immediately and thoroughly examine the site of the cutting or welding operations and the whole length of the shaft below the site with particular regard to the hazard of fire; and

(b) in the company of a mine official not below the rank of mine captain make a further examination as specified in paragraph (a) in not less than one hour or more than two hours after completion of the cutting or welding operations, and the results of the examination shall be logged and signed by both the person in charge of the operation and the mine official.

#### **Regulation 440—Commencement of winding after stoppage**

The manager of a mine shall ensure that in the mine where winding is stopped for the purpose of a repair or for any other purpose for a period that exceeds two hours, the winding engine is not used for raising or lowering a person until the cage, skip or other means of conveyance has undergone at least one complete trip up and down the working portion of the shaft.

#### Signals

#### **Regulation 441—Shaft signals required**

(1) The manager of a mine shall ensure that in the mine each winding shaft, which exceeds fifteen metres in depth and which is not exempted in writing by the inspector, is provided with an efficient means of interchanging distinct and definite signals between the winding engine, the top of the shaft, and the lowest point from which winding is carried out, and the various intermediate stations in use.

(2) Subregulation (1) does not apply to signalling apparatus used during sinking operations.

#### **Regulation 442—Each winding engine to be provided with a separate signalling system**

The manager of a mine shall ensure that in the mine, where more than one winding engine is in use in a shaft, a separate signalling system as specified in regulation 444 is provided for each winding engine in use.

#### **Regulation 443—Unauthorised persons not to signal**

An unauthorised person shall not give any signal other than an accident signal, or interfere in any manner with the signalling arrangements.

#### **Regulation 444—Code of shaft signals**

(1) The manager of a mine shall ensure that the following code of shaft signals are used and strictly observed in the mine:

- |   |     |     |     |          |
|---|-----|-----|-----|----------|
| (a) to raise an engine when it is at rest   | ... | ... | ... | 1 Bell;  |
| (b) to stop an engine when it is in motion  | ... | ... | ... | 1 Bell;  |
| (c) to lower an engine when it is in motion | ... | ... | ... | 2 Bells; |

- (d) when men are about to ascend, or descend in or alight from a Conveyance ... 4 Bells;
- (e) in response to indicate when men may enter or leave a cage or other conveyance in the shaft 4 Bells;
- (f) to change stations ... 3 Bells;
- (g) to stop a conveyance ... 5-5 Bells;
- (h) for an accident ... 5-5-5 Bells;
- (i) in transportation of explosives ... 6-6-6 Bells;
- (j) in shaft Repairs ... 1 long Bell.

(2) The following are the station signals:

Station	Number of Bells	Pause Bells
(a) 1	1	- 1
(b) 2	1	- 2
(c) 3	1	- 3
(d) 4	1	- 4
(e) 5	2	- 1
(f) 6	2	- 2
(g) 7	2	- 3
(h) 8	2	- 4
(i) 9	3	- 1
(j) 10	3	- 2
(k) 11	3	- 3
(l) 12	3	- 4
(m) 13	4	- 1
(n) 14	4	- 2
(o) 15	4	- 3
(p) 16	4	- 4
(q) 17	5	- 1
(r) 18	5	- 2
(s) 19	5	- 3
(t) 20	5	- 4

(3) A person shall not enter or leave a cage or other conveyance until the signal of "4 bells" has been received from the engine driver.

(4) A special signal in addition to the signals in subregulations (1), (2), and (3) may be used in a mine provided it has been approved in writing by the Chief Inspector as set out in Form Forty-Two of the First Schedule.

#### **Regulation 445—Signals during blasting**

The person in charge of blasting operations in a shaft in a mine shall, in the course of sinking a shaft, notify the engine driver by a special signal when blasting is about to take place.

#### **Regulation 446—Legible notice of signals**

The manager of a mine shall ensure that in the mine, the code of signals, specified in regulation 444 and any special signals that may be in use in the mine, are painted on a board or enamelled plate in the form of a distinctly legible notice in letters and figures not less than twenty-five millimetres in height and are conspicuously posted in the engine room, at the shaft bank and at shaft stations which are in use.

#### **Regulation 447—Authorisation of persons appointed to give signals**

(1) The manager of a mine shall appoint a person to give signals at winding shafts in the mine.

(2) A person shall not be appointed to give signals at a winding shaft in a mine where other persons are raised or lowered unless that person to be appointed has by examination satisfied the manager of the mine of that person's thorough knowledge of

(a) the code of signals prescribed under regulation 444;

(b) the winding operations carried out in the shaft; and

(c) the regulations to be observed in connection with the winding operations.

(3) An appointment made under this regulation shall be in writing.

#### **Regulation 448—Duties of persons authorised to give signals**

The person appointed under regulation 447 shall ensure that in a winding shaft in the mine where persons are raised or lowered

(a) the maximum number of persons allowed to travel in the conveyance is not exceeded;

(b) the doors or gates of the conveyance are properly closed when persons enter the conveyance;

(c) where applicable, the cover over the conveyance is in proper position before persons are allowed to enter the conveyance;

- (d) the doors, gates or barriers to the winding compartment are properly closed before the conveyance leaves the shaft station; and
- (e) the provisions of regulations 426 and 440, which prohibit
  - (i) the riding on the side or bow of a skip, or similar equipment, and
  - (ii) the use of the winding engine until the cage or skip has run one complete trip, are properly observed.

#### Winding engine drivers

##### **Regulation 449—Winch drivers**

A person shall not be in charge of a power winch or hoist used solely for the raising or lowering of rock or materials in a shaft or winze in a mine unless that person has satisfied the engineering manager or the representative of the engineering manager that that person is qualified and suitable to be a winch driver.

##### **Regulation 450—Winding engine drivers**

- (1) A person shall not be in charge of a winding engine in a shaft or winze in a mine unless that person is the holder of a winding engine driver's certificate of competency issued by the Chief Inspector of Mines.
- (2) A certificate of competency shall not be issued to an applicant by the Chief Inspector unless the applicant has satisfied a Board consisting of an inspector, the engineering manager or the representative of the engineering manager and a senior underground official that the applicant
  - (a) is literate;
  - (b) has successfully completed the pre-requisite training; and
  - (c) is suitable to be a winding engine driver.
- (3) A person whose sight or hearing is deficient or who is subject to any other mental or physical infirmity, likely to interfere with the effective discharge of that person's duties shall not drive, or be instructed or permitted to drive a winding engine.

##### **Regulation 451—Winding engine driver to undergo regular medical examination**

- (1) The manager of a mine shall ensure that each winding engine driver in the mine is medically examined at least once in every six months and if found unfit to perform the duties of a winding engine driver not be allowed to take charge of a winding engine.
- (2) The manager of a mine shall return the certificate of a winding engine driver found to be unfit under subregulation (1) to the Chief Inspector of Mines.
- (3) A winding engine driver who is dissatisfied with the results of an examination under subregulation (1), may appeal to the Chief Inspector of Mines for medical examination by an independent medical board.



#### **Regulation 452—Certificate to be withdrawn in certain cases**

(1) An inspector may endorse, suspend or withdraw the certificate of a winding engine driver who, in the opinion of the inspector

(a) displays gross inattention to, or negligence in the execution of the duties of a winding engine driver, or

(b) commits an act of misconduct which is likely to be detrimental to the efficient discharge of the duties of that winding driver engine and shall immediately report the endorsement, suspension or withdrawal to the Chief Inspector.

(2) A winding engine driver who is dissatisfied with a decision of the inspector under subregulation (1), may appeal to the Chief Inspector of Mines and notice of the appeal shall be given within fourteen days of the endorsement, suspension or withdrawal.

#### **Regulation 453—Tests to be recorded in winding engine driver's certificate**

(1) Where a person who is a winding engine driver is to be placed in charge of a winding engine in a mine and that person has not previously been in charge of that winding engine, the engineering manager shall examine and test that person to ascertain whether that person is fully competent to take charge of the winding engine.

(2) The date of the test conducted under subregulation (1), shall be recorded in the certificate of the person who has been tested.

#### **Regulation 454—Distinct signals to be received before starting engine**

A person who drives a winding engine in a mine shall not set the winding engine in motion before that person has received a distinct signal to do so and has repeated the signal in reply, except in accordance with instructions given to that person by the mine manager or the engineering manager.

#### **Regulation 455—Testing of brakes by driver**

A person shall not de-clutch a drum of a winding engine of which that person is the driver until that person is assured by testing the brake of the drum against the full power of the engine that the brake is in a proper condition to hold the load suspended from that drum.

#### **Regulation 456—Speed of winding of persons and precaution against shocks**

The driver of a winding engine which is in the process of raising or lowering a person in a mine shall

(a) not allow the winding speed of the engine to exceed that fixed by the inspector;

(b) avoid shocks in starting; stopping and running the engine; and

(c) correctly apply each device and means at that driver's disposal to prevent the conveyance from overrunning the highest or lowest landing place for persons, or any intermediate landing place to which the conveyance is signalled.

### **Regulation 457—Winding engine drivers log book**

A driver of a winding engine in a mine shall keep an accurate log book in the winding engine and the log book shall be as set out in Form Thirty-Three in the First Schedule.

### **Regulation 458—Winding engine driver to observe certain provisions**

A driver of a winding engine in a mine shall, where applicable, carefully observe the provisions of regulations

- (a) 4291)(1)(c) which relates to stopping the bucket before it reaches the bottom of the shaft or winze,
- (b) 438(1) which relates to the signals to be given when the brass token is removed which is "one long bell",
- (c) 444 which relates to the Code of shaft signals, and
- (d) 454 to 457.

### Examination and testing of winding equipment

#### **Regulation 459—Examination of winding equipment**

(1) The manager of a mine shall in writing appoint a competent person to carefully examine in the mine

(a) at least once each day, the winding ropes, the balance or tail ropes, the connections of the ropes to the conveyances and drums, the conveyances, the pulley wheels and sheaves, the brakes, the depth indicator, the safety devices, and all external parts of the winding equipment the proper working of which the safety of persons in the mine depends on;

(b) at least once each week, the signalling arrangements and the safety devices used in connection with the signalling arrangements; and

(c) at least once each week, the guides or rails and the winding compartment generally, including the doors, gates or barriers and ancillary equipment at stations and landing platforms.

(2) The engineering manager, or a competent person appointed by the engineering manager in writing, shall carefully examine in the mine

(a) at least once each week, the external parts of the winding engine, the safety devices and the head gear pulley wheels and sheaves;

(b) at least once each two weeks, the connections referred to in subregulation (1) (a), and the structure of the winding rope and the balance or tail ropes, with a view to ascertaining the amount of deterioration of the winding rope and tail rope;

(c) for the purpose of the examination in paragraph (b) cause the rope to be thoroughly cleaned at the places selected by the Engineer who shall note any reduction in the diameter or circumference of, and the proportion of wear in, the rope; and

(d) at least once in each year, the winding system as to the working condition of the internal mechanical parts and as far as reasonably practicable, of the internal electrical parts.

(3) The engineering manager, shall ensure that in the mine

(a) effective steps are taken to prevent water, grease, or oil from being deposited on the brake paths of any winding engine;

(b) daily brake holding tests are carried out on mechanical brakes with each drum being tested independently; and

(c) daily retardation tests are carried out on dynamic or other electrical braking systems, where applicable.

(4) The manager of a mine shall unless exempted in writing by the Chief Inspector of Mines ensure that in the mine voice communication is available between principal landing places in a winding shaft and the winding engine driver.

#### **Regulation 460—Testing of winding plant, brake components, ropes and attachments**

The manager of a mine shall ensure that in the mine, at least

(a) once in every twelve months, each part of a winding plant is thoroughly examined and tested and the records of the spection kept by the inspector; and

(b) once in every twelve months, each single line components of the winding plant brake system, the drum shaft, and cage or skip attachments are subject to non destructive test.

#### **Regulation 461—Duty when defect is discovered**

(1) Where on an examination or test required by regulations 459 and 460 there is discovered a weakness or defect which may endanger the safety of persons in the mine, the weakness or defect shall immediately be reported to the manager of the mine in writing.

(2) The manager of a mine to whom a weakness or defect is reported under subregulation (1) shall ensure that until the weakness or a defect is remedied, the winding plant is isolated from the power supply, locked out and tagged and is not used except as far as is necessary for remedying the weakness or defect.

#### **Regulation 462—Machinery Record Book and Shaft Log Book**

(1) The manager of a mine shall ensure that a true report of the result of each examination or test required by regulations 459 and 460 are recorded and signed without delay in the Machinery Record Book or Shaft Log Book, as set out in Form Thirty-Four of the First Schedule.

(2) The Machinery Record Book and the Shaft Log Book shall be kept

(a) in the mine, and

(b) open for inspection by the inspector

Surface mine equipment

### **Regulation 463—Hydraulic Excavators**

- (1) The manager of a mine shall in relation to the mine prepare written excavation and loading rules detailing the procedures to be followed during excavation and loading operations.
- (2) The manager of a mine shall ensure that in the mine
  - (a) electrically powered equipment are disconnected before mechanical work is done on the equipment;
  - (b) power switches are locked out and tagged or other measures taken to prevent the equipment being connected again without the knowledge of the persons working on it; and
  - (c) locks and tags or protective devices are not removed except by the person who installed them or by an authorised person.
- (3) In case of an unforeseen interruption of the electric power supply, the operator of the equipment shall immediately return each starter and control lever to the "stop" or "zero" positions.
- (4) The manager of a mine or a competent person authorised by that manager shall
  - (a) cause to be prepared, and
  - (b) approve a technical instruction sheet for each machine in operation.
- (5) The technical instruction sheet shall
  - (a) contain information on the technical details relating to the machine;
  - (b) other information including the permissible dimensions of working places, bench heights, stability angles and distances that are to be maintained by mining machines and transport equipment from working faces, dumps and tipping points; and
  - (c) be posted in the proximity of the operator's position on the machine to which the sheet relates.
- (6) The manager of a mine shall ensure that in the mine
  - (a) the cabin of each excavating machine is constructed in a manner that enables the operator always keep the part of the face of the cabin which adjacent to the machine in sight;
  - (b) each site on which an excavating machine is operating is equipped with a means of communication with the machine operator;
  - (c) an unauthorised person is not allowed in the cabin or on the external platforms of an operating excavator;
  - (d) cabin windows are made of safety glass or equivalent and are in good condition and kept clean; and
  - (e) a person does not mount or enter an excavator which is in operation and capable of movement without first attracting the operator's attention.
- (7) The operator of an excavator in a mine shall ensure that
  - (a) When moving the excavator, the driven axle is always positioned either at the downhill end or at the rear if the machine is level base plane;
  - (b) the bucket is empty and maintained at a height of not more than one metre above the ground;

(c) the jib faces in the direction of motion, and

(d) when moving on a gradient, every possible precaution is taken against sliding of the excavator.

(8) The manager of a mine shall ensure that in the mine, excavators are only moved with the aid of an assistant to the operator.

(9) The assistant of an operator shall use approved signals and shall be within sight of the operator at all times.

(10) The manager of a mine shall ensure that in the mine,

(a) in case of walking excavators, where necessary, signals are transmitted from the operator's assistant through a third member of the team;

(b) excavators stand on a firm and level base, with a gradient not exceeding the permissible gradient specified in the technical instruction sheet;

(c) in each case, the distance from the flank of a bench or dump or any transport vehicle to the counterweight of an excavator is not less than one metre, and

(d) the cabin of the excavator during operation is positioned in a manner that ensures that danger to the operator is minimised.

(11) The manager of a mine shall in relation to the mine

(a) establish a special code of signals for operators of excavators to be applied during the loading operation and the code shall be posted in a prominent position on the excavators;

(b) ensure that a free passage is maintained at all times to enable an excavator to be speedily removed from a mining face; and

(c) ensure that an excavator in operation is stopped and immediately removed to a safe place when a dangerous condition is detected, and particularly when there is a likelihood of rock falls from the face or when misfires have been located in the working area.

#### **Regulation 464—Draglines**

(1) The manager of a mine shall establish safety rules for the mine and bring those rules to the attention of each person who works in the mine or visits the mine, in cases where stripping and loading operations are performed with the aid of a dragline excavator.

(2) The safety rules shall, among others provide for safe distances between machines when two or more types of machines are working together.

#### **Regulation 465—Vehicles in surface mines**

(1) The manager of a mine shall ensure that in the mine each equipment and vehicle is of an approved type and conforms with specifications and requirements for safety.

(2) The Chief Inspector of Mines may prescribed standards for safety equipment and protective devices to be incorporated in mobile plants and shall, for vehicles newly purchased, to be

prescribed, specify the necessary safety equipment and protective devices against falling objects, vehicle roll-over and workers falling out of the vehicle.

(3) The manager of an opencast mine shall, unless exempted in writing by the Chief Inspector of Mines, ensure that each mobile equipment used in the mine is of an approved type and carries an identity number.

(4) The manager of an opencast mine shall, draw up transport rules to regulate the movement and operation of vehicles in the mine.

(5) The transport rules shall be posted at a conspicuous place in the mine and a copy given to all drivers and equipment operators.

(6) The manager of an opencast mine shall ensure that in the mine

(a) a self-propelled mobile equipment is provided with adequate braking systems, capable of effectively stopping and holding the vehicle stationary when fully loaded, under any conditions of operation;

(b) a vehicle is not left unattended to unless

(i) the controls are in neutral position and the parking brakes are fully applied;

(ii) the vehicle is a tracked and wheeled vehicle parked on a grade and it is blocked or turned into a rib or bank;

(iii) the movable parts of equipment including dippers, buckets and scraper blades are secured or lowered to the ground when not in use;

(iv) in the case of electrically powered mobile equipment where the master switch is in the off position, all operating controls are in the neutral position, and the brakes are set or other equivalent precautions are taken against rolling; and

(v) the vehicle has been locked out in a manner that prevents unauthorised operation by other persons;

(c) where a vehicle is in motion between work areas, the movable parts of the equipment are secured in the travel position;

(d) the engine exhaust gases from a mobile equipment operated by an internal combustion engine shall be discharged

(i) at a point remote from the operator's position and from any air-conditioning intake, and

(ii) in a manner that ensures they do not generate dust;

(e) each motor vehicle is equipped with

(i) effective headlights, tail-lights and clearance lights; and

(ii) an effective audible warning signal which can be sounded when the driver wishes to move the vehicle and the driver does not have clear vision immediately in front and behind;

(f) each heavy duty mobile equipment is fitted with automatic fire suppression system in addition to portable fire extinguishers of a certified type and capacity;

(g) a person does not operate, or is not employed or permitted to drive, a motor vehicle in the mine unless that person

(i) holds a current operator's licence for that vehicle, and

(ii) has satisfied the manager or the manager's representative that that person is competent to operate that vehicle;

(h) each operator of a vehicle or mobile machine maintains full control of the vehicle or machine while it is in motion;

(i) where loads are carried which project beyond the sides of a vehicle, or by more than one than one metre beyond the rear of the vehicles, there is attached at the end of the projection,

(i) a warning light during the hours of darkness or where visibility is limited, and

(ii) a clearly visible warning flag of suitable size in day-light conditions;

(j) where overhead clearance is restricted, a warning device is installed and the restricted area is conspicuously marked; and

(k) where regular transportation of persons is required, buses or other specially fitted vehicles equipped with seating and safe means of entry and exit are used.

(7) The manager of an opencast mine shall

(a) prohibit the transportation in the mine of persons

(i) in or on a mobile equipment whether, loaded or unloaded, unless special arrangements are made for the safety of the persons being transported and the transportation is authorised by the manager;

(ii) outside the cabs and beds of mobile equipment; and

(iii) in a vehicle equipped with unloading devices, unless a means is provided to prevent accidental operation of the unloading mechanism; and

(b) ensure that in the mine a machine is not serviced or maintained if that machine has not been effectively locked out to prevent inadvertent use by a person working on the machine.

#### **Regulation 466—Trucks**

The manager of a mine shall in relation to the mine

(a) provide tipping body props or other similar devices and ensure that the props and other devices are capable of preventing a skip from collapsing, and have a mode of operation independent of the tipping mechanism;

(b) ensure that the operator's cab of a mine vehicle,

(i) in the case of a vehicle used for rock haulage, is constructed or reinforced in a manner that enables the cab to resist damage by spillage;

(ii) is not additionally equipped, altered or otherwise modified in a manner which impairs operating visibility;

(iii) in the case of a mobile equipment is kept free of extraneous materials; and

- (iv) has a design and layout which ensures that the operator's positions and controls conform with best ergonomic principles;
- (c) ensure that the design of the operator's cab of a mine vehicle provides
  - (i) an efficient layout and direction of movement of control devices;
  - (ii) for the operator's seating;
  - (iii) protection against environmental hazards, including inclement weather, heat,
  - (iv) protection against noise and airborne dust; and
  - (v) safe entry and exit for the operator; and
- (d) ensure that haulage equipment are operated under power control at all times.

#### **Regulation 467—Drill rigs in surface mines**

The manager of a mine shall in relation to the mine ensure that

- (a) before drilling operations are commenced, the area is carefully inspected for misfires, sockets and other hazards;
- (b) after a hole has been drilled, it is closed off by a plug;
- (c) standard instructions are prepared and followed for each type of drilling employed;
- (d) drilling rigs are operated on a level surface;
- (e) where a rig is being worked on a bench, the rig is located at a distance of not less than three metres from the bench crest, especially when drilling the nearest hole to the crest, in which case, the crest shall be behind the operator;
- (f) while in operation, a drilling rig is arranged in a manner that ensures that its longitudinal axis is perpendicular to the bench crest;
- (g) where a drill is being moved from one drilling area to another, drill steel, tools and all other parts of the machine are secured, and the mast placed in a safe position;
- (h) where a drill helper assists the drill operator during the movement of a drill to a new position, the helper is in sight of, or in communication with, the operator at all times;
- (i) a person is not allowed to be on a rig mast while the drill-bit is in operation unless that person is provided with a safe platform from which to work and is wearing a safety belt;
- (j) where the rig mast is being raised or lowered, persons are not permitted to remain in front of or behind the drilling rig;
- (k) tools or other objects which are likely to cause injury to personnel are not left loose on the mast or drill platform; and
- (l) in the case of rotary drilling rigs for which the assembling and dismantling of the drilling set and the cleaning of the mouth of the hole are not mechanised, the augers are enclosed and interlocked with the electric power supply to the rotary driving motor.



### **Regulation 468—Conveyor belts in surface mines**

The manager of a mine shall ensure that in the mine

- (a) a person does not ride on a conveyor belt;
- (b) a person does not clean underneath a moving conveyor, or a part of a moving conveyor, unless approved and adequate protective guards are in place;
- (c) return idlers are guarded at places where workmen are likely to cross underneath the conveyor; and
- (d) take-up pulleys, tensioning weight and all other components of the tensioning system are, unless exempted in writing by the Chief Inspector, guarded.

### General provisions for small scale mining

#### **Regulation 469—Application**

- (1) Regulation 469 to 492 applies to small scale mining only.
- (2) The Chief Inspector of Mines may establish different classes of small scale mining operations and make the classes established subject to all or any of the provisions of these Regulations.
- (3) The Chief Inspector of Mines in determining which provisions of these Regulations are applicable to the classes established under subregulation (2) shall take into consideration
  - (a) the health and safety risks at the mine at which the mining operation is undertaken;
  - (b) the size of the mining operation conducted by the small scale miner;
  - (c) the number of employees working at the mine; and
  - (d) the nature of the mining operation.

#### **Regulation 470—Competency of small scale miners**

- (1) A person may be granted a licence to operate a small scale mining operation if that person has the proven knowledge required for small scale mining or that person has appointed another person who has the required knowledge to be in charge of the small scale mining operation.
- (2) The holder of a mining licence for a small scale mine which
  - (a) employs more than thirty individuals; or
  - (b) uses explosives shall ensure that work within the mine is
    - (i) done under the supervision of a sufficient number of individuals each of whom holds a certificate of competency as a blastman or another qualification approved by the Chief Inspector of Mines, and
    - (ii) undertaken in a manner that does not expose the workmen to hazards.
- (3) A person appointed as a supervisor under sub-regulation (2) shall take steps that are practicable to ensure that workmen under that person's supervision in the mine are not exposed to hazards.

#### **Regulation 471—Blasting in small scale mines**

- (1) The holder of a small scale mining licence shall not carry out blasting in the mine, if that holder has not obtained the written permission of the Minister to carry out the blasting.
- (2) The written permission shall only be granted by the Chief Inspector of Mines and shall be as stated in Form Thirty-Six as provided for under regulation 472.
- (3) The holder of a small scale mining licence shall
  - (a) prepare for the mine a schedule for blasting which shall specify the time for blasting in identified parts of the concession and
  - (b) institute measures that ensure that blasting in one part of the concession does not expose a person in another part of the concession to danger.
- (4) The holder of a small scale mining licence shall update the schedule at least once in every three months and shall submit a copy of the updated schedule to the Inspectorate Division within forty-eight hours after each update.
- (5) The holder of a small mining licence shall ensure that a person does not enter or cause or permit another person to enter a place in the mine which is contaminated with dust or fumes from blasting unless the period during which re-entry to that place is prohibited has expired and the holder is satisfied that the air is suitable for breathing.

#### **Regulation 472—General duties of small scale miners**

- (1) The holder of a small scale mining licence shall not undertake any activity or carry out any operation within a mining concession if that holder has not submitted an application as set out in Form Thirty-Five of the First Schedule, for approval and the issue of a Small Scale Mining Operating Permit, to the Inspectorate Division.
- (2) The Inspectorate Division may approve and issue a Small Scale Mining Operating Permit as set out in Form Thirty-Six of the First Schedule to the applicant if the applicant
  - (a) submits a plan showing the boundaries of the small scale mining concession; and
  - (b) submits a plan showing how the applicant intends to carry out the mining operations; and
  - (c) explains how the applicant intends to rehabilitate the mined area.
- (3) The holder of a small scale mining licence may only start operations after the area within the mining concession where that holder intends to start the mining operations has been inspected by the Inspectorate Division on request by the holder.

#### **Regulation 473—Health and safety rules for small scale mining**

- (1) A person shall only use mercury in relation to small scale mining if that person has the written permission of the Chief Inspector of mines to do so and that person uses a retort to apply the mercury.

(2) The holder of a small scale mining licence shall provide adequate sanitation facilities at the mining site.

#### **Regulation 474—General health and safety duties**

(1) A holder of a small scale mining licence shall ensure that the environment within the mine does not expose workers in the mine to environmental hazards and the holder shall in particular

(a) provide and maintain in the mine, work places, plant, equipment and systems of work which ensures that a person working in the mine is not exposed to any hazards;

(b) provide sufficient information, instruction and supervision to ensure that a person working in the mine is not exposed to hazards;

(c) ensure that each person working in the mine is educated on occupational health and safety procedures at the mine;

(d) provide each person working in the mine with adequate protective clothing and equipment against any unavoidable hazards; and

(e) ensure that in the mine

(i) the use, cleaning, maintenance, transportation and disposal of a plant;

(ii) the use, handling, processing, storage, transportation and disposal of substances; and

(iii) the use, handling, storage, transportation and disposal of mercury, is carried out in a manner that ensures that a person working in the mine or any other person is not exposed to hazard.

(2) A small scale miner who contravenes sub-regulation (1) commits an offence and is liable on summary conviction to a fine of not more than ten thousand penalty units or a term of imprisonment of not more than fifteen years or to both.

#### **Regulation 475—Health and Safety Code for small scale mining**

(1) The Chief Inspector of Mines shall publish a Health and safety Code which sets out health and safety procedures for small scale mines and each small scale miner shall comply with the code.

(2) A small scale miner who fails to comply with the Health and Safety Code commits an offence and is liable on summary conviction to a fine of not more than one thousand, five hundred penalty units or a term of imprisonment of not more than four years or both.

(3) A person working, or present in a small scale mine, shall comply with the applicable Health and Safety Code.

#### **Regulation 476—Machinery for small scale mining**

Regulation 287 to 468 applies with the necessary modifications to machinery used in small scale mining operations.

### **Regulation 477—Inspection of small scale mining**

An inspector of Mines or a person authorised by the Inspectorate Division of the Minerals Commission shall periodically inspect each small scale mine.

### **Regulation 478—Overhanging**

A person working in a small scale surface mine shall not cut or permit to be cut a face or a sidewall in the mine, and the holder of the mining licence in relation to that mine shall ensure that any face or sidewall in that mine does not have a vertical height of more than one and a half metres unless the face or sidewall is terraced, sloped or supported at an angle that ensures the safety of each person who works in the mine.

### **Regulation 479—Slope of pits**

The holder of a small scale mining licence shall ensure that in the mine to which the licence relates,

(a) where earth, clay, sand, gravel or any other unconsolidated material is removed from the surface in the course of working of that mine with a powered equipment,

(i) the working face shall be sloped at the angle of repose; or

(ii) the vertical height of the working face shall not be more than one and a half metres above the maximum reach of the equipment;

(b) where earth, clay, sand, gravel or any other unconsolidated material is removed from the surface in the course of working with an equipment which is not powered;

(i) the working face shall be sloped at its angle of repose; or

(ii) the vertical height of the working face shall not be more than three metres;

(c) a person does not undercut a working surface.

(d) except where mining activities are actively in progress, benches and walls are sloped to an angle which is less than the angle of repose.

### **Regulation 480—Environmental protection provisions for small scale mining**

(1) The holder of a small scale mining licence shall

(a) rehabilitate and revegetate land which is no longer used for mining within one month after termination of activities on the land.

(b) within one month after the abandonment of the mine, backfill disused trenches, excavations and pits in a manner that prevents the accumulation of stagnant water.

(2) The Chief Inspector of Mines shall conduct a final inspection of the abandoned mine after rehabilitation work at that mine is completed and shall if satisfied with the rehabilitation, issue a rehabilitation certificate as set out in Form Thirty-Seven of the First Schedule to the holder of the licence to that mine

## Underground small scale mining

### **Regulation 481—General duties of underground small scale miners**

The holder of a small scale mining license may only start operation or an activity in a mine if that holder has

- (a) submitted a plan which shows the boundaries of the small scale mining concession;
- (b) ensured that underground boundaries are vertical projections of the surface concession boundaries; or
- (c) prepared, under the direction of a qualified person, plans and procedures to be used in the construction and operation of the underground mine.

### **Regulation 482—Two outlets from mine to surface necessary**

(1) The holder of a small scale mining licence shall ensure that

- (a) before any person is employed in the mine, each underground working in the mine has two shafts, adits, tunnels or outlets that afford communication with every vein, lode, reef, ore body or mineral deposits; and.
  - (b) a second means of access is established where there exists only one means of access to workings and where shaft sinking, reef drives and other workings progress more than fifteen metres from the shaft.
- (2) Subregulation (1) does not apply to the interruption of ingress or egress or of communication within the mine workings which occurs as a result of an accident or dangerous occurrence.

### **Regulation 483—Access to underground workings**

The holder of a small scale mining licence in respect of an underground mine shall ensure that

- (a) a person does not enter or leave an underground working in the mine except through an entrance or exit specially provided for that purpose;
- (b) each shaft in the mine which is used as an entrance or exit is provided with a properly constructed ladder-way or an approved mechanical means of hoisting;
- (c) a hemp rope is not used for entering or leaving an underground working in the mine, except at the initial stage of development and except where the depth of the underground working is not more than ten metres;
- (d) a person does not enter an underground working in the mine if that person is not wearing sufficient protective clothing including a helmet, safety boots and overalls;
- (e) a person does not fight or use drugs or intoxicating liquor underground in the mine; and
- (f) a system by which each person who goes underground can be accounted for at any point in time is established in the mine.

**Regulation 484—Securing of workings with unsafe ground conditions**

(1) The holder of a small scale licence shall ensure that where the natural strata of the mine to which the licence relates is not safe, each working is securely supported, filled in, or otherwise kept in safe condition.

(2) A person shall not take the ore left in situ which is used for underground support in a mine unless that person has obtained the approval of the Chief Inspector of Mines.

**Regulation 485—Stagnant water**

(1) The holder of a small scale mining licence shall ensure that in the mine to which the licence relates stagnant water is not allowed to form on the floor of a working which is active and that any pool of water that forms on the floor is drained off.

(2) A person working in a small scale mine shall not use a fuel-powered water pump or any other fuel powered equipment underground except with the written permission of the Chief Inspector of Mines.

**Regulation 486—Quality of underground mine air**

The holder of a small scale mining licence shall ensure that in the mine to which the licence relates there is adequate ventilation to any place underground where a person is working.

**Regulation 487—Persons not allowed to stay in foul air**

A person shall not enter, work, remain or permit another person to enter, work or remain

(a) underground in a mine which is not well ventilated, or

(b) in any other place in the mine where the person is likely to be exposed to an excessive amount of toxic gas, fumes or dust or excessive temperatures.

**Regulation 488—Powers of Chief Inspector of Mines to prescribe minimum underground mine air quality**

(1) The chief Inspector of Mines shall prescribe the standard quality of air in a mine.

(2) The holder of a small scale mining licence shall ensure that the air in all workings that are in the mine to which the licence relates and in which a person is employed or is to be employed is free from dangerous amounts of noxious impurities and contains sufficient oxygen to obviate danger to the health of any one employed in the mine.

#### **Regulation 489—Use of air under pressure for cleaning underground prohibited**

The holder of a small scale mining licence shall ensure that a person working in the mine to which the licence relates does not use air under pressure to clean that person's or another person's body or clothing unless the air under pressure is mixed with water.

#### **Regulation 490—Light to be carried underground**

The holder of a small scale mining licence shall ensure that a person working in the mine to which the licence relates does not go underground unless that person has an operable lamp of the type approved by the Chief Inspector of Mines and always keeps the lamp alight and within safe and easy reach.

#### Processing plants for small scale mining

#### **Regulation 491—Provision for processing plants**

(1) The holder of a small scale mining licence shall not start a processing activity in relation to small scale mining unless that licence holder has submitted to the Chief Inspector of mines, a layout of the processing infrastructure indicating the

- (i) plant;
- (ii) process water sources and ponds; and
- (iii) tailings storage facility.

(2) A person shall not process ore obtained from a small scale mine except in a location approved by the Chief Inspector of Mines.

(3) The manager of an ore processing plant shall ensure that each plant area is locked, has a warning sign and is entered only by authorized personnel.

#### **Regulation 492—Crushing, screening and mechanical processing plant**

(1) The manager of an ore processing plant shall provide each plant with a dust suppression or dust catchment system.

(2) A person who enters a plant shall wear the prescribed personal protective clothing and possess the required personal protective equipment.

#### Tributers

#### **Regulation 493—Employment of a tributer**

(1) The holder of a mining lease or a small scale mining licence may, with the permission of the Chief Inspector of Mines, employ a tributer.

(2) The Chief Inspector of Mines may in order to secure safe or economic mining of an area, refuse to grant permission to a holder of a mining lease or small scale mining licence to employ a tributer.

(3) Where the holder of a mining lease or a small scale mining licence is convicted of an offence under regulation 495 to 506 the Chief Inspector may refuse to grant permission to that holder to employ a tributer in that area.

#### **Regulation 494—Token to be issued to tributer**

(1) A person shall not be employed in a mine as a tributer unless that person is issued with a token by the mining lease holder or the small scale mining licence holder.

(2) The token shall have a distinctive pattern and a serial number.

(3) A person issued with a token shall not transfer the token to another person.

(4) Where a tributer ceases to work in the mine, the tributer shall immediately return the token to the holder of the licence of that mine.

#### **Regulation 495—Tributer's register**

(1) The holder of a mining lease or a small scale mining licence shall in respect to the small scale mine to which the licence relates keep a register of tributers in the form of a securely bound book.

(2) The register shall contain the name of each tributer who works in the mine and the serial number and the date of issue of the token of each tributer.

(3) A holder of a mining lease or a small scale mining licence shall ensure that

(a) each tributer who is registered by the holder is not registered with any other small scale mine licence holder; and

(b) a tributer shall not contract another person to work in that portion of the mine assigned to the tributer unless that person has been registered and issued with an identification with respect to that portion of the mine.

(4) The tributer shall make the register available for inspection by the holder of the mining lease or the small scale mining licence at the end of each month.

#### **Regulation 496—Removal of name from Register**

The holder of a mining lease or a small scale mining licence shall remove the name of a tributer from the register where the tributer

(a) is dismissed by that holder,

(b) returns a token, or

(c) ceases to work as a tributer for that holder.



#### **Regulation 497—Offences in respect of registration and token**

A person who contravenes regulation 494 to 496 commits an offence and is liable on summary conviction to a fine of not more than five thousand penalty units or a term of imprisonment of not more than ten years or to both.

#### **Regulation 498—Duties of a holder who employs a tributer**

(1) The holder of a mining lease or small scale mining licence who employs a tributer shall ensure that the tributer works in a safe environment and is properly disciplined.

(2) The holder of a a mining lease or small scale mining licence or a person authorized by that holder shall be present on that portion of the mine when a tributer is mining or dressing mineral.

#### **Regulation 499—Limitation of hours of work and movement of mineral of tributer**

(1) A holder of a mining lease or a small scale mining licence shall not permit a tributer to that holder to mine or dress mineral between 6:00 p.m. and 6:00 a.m. except with the prior permission in writing of the Chief Inspector of Mines.

(2) A tributer shall not move mineral between 6:00 p.m. and 6:00 a.m. except where the mineral which has been received by the holder of the mining lease or small scale mining licence or the authorized representative of that holder and the movement is under the direct supervision of that holder or representative.

(3) Subject to subregulation (2) a tributer may move mineral only between 6:00 a.m. and 6:00 p.m. and within the boundaries of the portion of the mine in respect of which the tributer is registered.

#### **Regulation 500—Tributer to work only on assigned portion of mine**

A tributer shall not

(a) work or mine in a portion of a mine unless the tributer is registered and is in possession of a token with respect to that portions; and

(b) remove from that portion of the mine any mineral won except as provided for in subregulations (2) and (3) of regulation 499.

#### **Regulation 501—Delivery of mineral**

(1) A tributer to a holder of a mining lease or a small scale mining licence shall declare the mineral production of that tributer to the holder.

(2) A tributer shall deliver mineral won from the portion of the mine assigned to that tributer to

(a) the holder who employs the tributer;

(b) an authorized representative of the licence holder; or

(c) a licenced buying agent, with the approval of the holder.

#### **Regulation 502—Limitation on receipt or mineral**

A holder of a mining lease or a small scale mining licence or an authorised representative of that holder shall not receive mineral from a tributer unless the tributer is registered by that holder and the tributer is in possession of a token.

#### **Regulation 503—Duties of a receiver**

A holder of a mining lease or small scale mining licence who receives mineral from a tributer shall

- (a) record the particulars of the token of the tributer,
- (b) weigh the mineral.
- (c) remunerate the tributer between 6:00 a.m. and 6:00 p.m. on the day of receipt, and
- (d) keep the mineral record of the tributer in a secure form and place.

#### **Regulation 504—Disclosure of mineral won**

Each tributer shall fully disclose the mineral won by that tributer to the person to whom the tributer is required under these Regulations to deliver the mineral.

#### **Regulation 505—Place of receipt mineral**

- (1) A person shall not receive mineral from a tributer in a District other than the District in which the tributer is registered.
- (2) A person shall not receive mineral from a tributer unless that person has the register and mineral record of that tributer at the time and place of receipt of the mineral.

#### **Regulation 506—Tributer system prohibited in exploration**

A person shall not engage a tributer on a concession that is granted solely for exploration.

Safety of workmen and conditions of employment

#### **Regulation 507—Minimum age of workmen**

- (1) A person shall not be employed in a mine, unless that person is at least eighteen years old.
- (2) A person shall not work in an underground mine unless that person is at least twenty-one years old.

### **Regulation 508—Language**

A manager of a mine shall ensure that a supervisor of employees in the mine can communicate with the employees who work under that supervisor.

### **Regulation 509—Records of employees to be kept**

(1) A manager of a mine or the holder of a small scale mining licence shall keep a register which contains

- (a) the name, other personal particulars and photograph of each person employed in the mine;
- (b) the date of engagement and termination of employment of each person employed in the mine; and
- (c) the date, place and cause of death of a person who dies in the course of duty in the mine.

(2) An inspector or a person authorized by the inspector shall for the purposes of inspection have access to the register at reasonable times.

(3) The manager of a mine or the holder of a small scale mining licence shall retain the information of a person in the register for a period of twenty-four months after a person ceases to work in the mine.

### **Regulation 510—Maximum working time of employees**

(1) Subject to sub-regulation (2), a manager of a mine or a holder of a small scale mining licence shall not permit a person to work in an underground mine for more than

- (a) eight hours in a period of twenty-four hours; or
- (b) forty hours in a period of seven-days.

(2) A manager, of a mine or a holder of a small scale mining licence may permit a person to work underground in the mine for more than the stipulated time where the work involved is

- (a) necessary for the safety of the mine; or
- (b) of an emergency or special nature.

(3) Subject to sub-regulation (2), a manager of a mine or a holder of a small scale mining licence shall not employ a person at the surface in a mine, for more than

- (a) eight hours in a period of twenty-four hours; or
- (b) forty-five hours in a period of seven days.

(4) Where an inspector has reason to believe that an employee in a mine works for excessive hours, the inspector may direct the manager of the mine to reduce the hours of work of the employee.

### **Regulation 511—Overseer to ensure compliance with condition of employment**

A manager of a mine or a holder of a small scale mining licence shall ensure that each worker complies with these Regulations.

### **Regulation 512—Medical examinations**

(1) The manager of a mine or a holder of a small scale mining licence shall ensure that

(a) an employee of the mine does not undertake any work in the mine unless the fitness and health of that employee has been assessed as sufficient to enable that employee to carry out that work safely; and

(b) the fitness of each employee of the mine is assessed, on a regular basis, to determine whether the fitness and health of that employee is sufficient to enable that employee to continue to safely carry out work of the nature carried out by that employee.

(2) An assessment under subregulation (1) shall be undertaken by a medical practitioner or by another appropriate person qualified to undertake the assessment and the assessment shall have regard to the type of work to be undertaken by the employee and the level of fitness required to safely undertake that work.

(3) The manager of a mine or the holder of a small-scale mining licence shall bear the cost of each medical examination required under this regulation and shall not, directly or indirectly, seek to pass the cost of that medical examination to the affected employee.

(4) The manager of a mine or the holder of a small mining licence shall ensure that the medical record of each employee is maintained for a period of

(a) ten years from the date of the a particular medical examination;

(b) six years from the date the employee ceases to work at the mine; or

(c) until the closure of the mine, which ever occurs earlier.

(5) The manager of the mine or the holder of a small scale mining licence shall ensure that

(a) an employee of a mine is given a copy of that employee's medical record and the result of any medical examination carried out on the employee, and

(b) the result of any medical examination is explained to the employee who undertook the examination.

### **Regulation 513—Offences against condition of employment provisions**

(1) The holder of any certificate issued under these Regulations who acts negligently or in a manner which results or is likely to result in the injury of a person employed in or about a mine commits an offence and is liable on summary conviction to a fine of not more than one thousand penalty units or a term of imprisonment of not more than four years or both.

(2) Where a court convicts a person for an offence against these Regulations the manager of the mine in which that person is employed shall give notice of the conviction with the name and the address of the person convicted and the details of the offence to the Chief Inspector of Mines.

(3) The Chief Inspector of Mines may

(a) suspend or cancel the certificate of a person convicted by a court for an offence against these Regulations, or

(b) declare the person convicted of the offence to be disqualified from holding or obtaining a certificate, for a period that the Chief Inspector of Mines considers necessary.

(4) The Chief Inspector of Mines shall keep a record of each action taken under this regulation.

#### Duties of owner regarding safety of workmen

##### **Regulation 514—Warning signs**

(1) The manager of a mine or a holder of a small scale mining licence shall ensure that a danger warning sign is erected and maintained in the appropriate position prescribed by these Regulations or as required by an inspector.

(2) A danger warning sign shall

(a) be as set out in Form Thirty-Eight in the First Schedule or as approved by an inspector,

(b) be capable of being understood by each employee working in the mine, and

(c) not conflict with any other sign prescribed by these Regulations or another enactment.

##### **Regulation 515—Code of safe working practice**

(1) The manager of a mine or the holder of a small scale mining licence, shall develop a safe working practice code which ensures that a person in the mine is not exposed to an operational hazard at the mine.

(2) The practice code shall be approved by an inspector.

(3) The practice code shall be used by each person engaged in

(a) a mining operation, which includes drilling, blasting, loading and hauling;

(b) processing of ore;

(c) handling, transport and disposal of tailings and waste rock;

(d) an electrical or a mechanical workshop;

(e) the provision of infrastructure and ancillary facilities; and

(f) the maintenance or repair of machinery, equipment or appliance which prevents danger from the inadvertent start-up or the electrical energising of the machinery equipment or appliance.

(4) The manager of a mine or a holder of a small scale mining licence shall ensure that written procedures kept

(a) under sub-regulation (1); or

(b) under any other provision of these regulations,

are current and available to each employee of the mine to whom the procedures apply and that each of those employees is aware of the current written procedures.

(5) The manager of a mine or the holder of a small scale mining licence shall ensure that written procedures kept under sub-regulation (1) for an activity carried out in the mine contain

(a) the purpose of the procedure;

(b) details of the activity to which the procedures apply;

(c) the responsibilities of each person involved in the activity;

(d) a description of how the activity is to be carried out;

(e) a reference to other relevant written procedures; and

(f) the date of the written procedures and the last update of the procedures.

(6) The manager of a mine or the holder of a small scale mining licence shall ensure that written procedures prescribed under sub-regulation (1)

(a) is in a form suitable for use at the site where the activity is carried out;

(b) is easily understood by each person who carries out the activity; and

(c) are relevant to the risks which the procedure are designed to manage.

(7) A person working in a mine shall comply with the applicable written procedures and the manager of a mine or a holder of a small scale mining licence shall ensure that each person adheres to the practice code.

#### **Regulation 516—Amenities to be provided by owner**

(1) The owner of a mine, manager of a mine or a holder of a small scale mining licence, shall ensure that changing rooms are provided

(a) near to man riding shafts on the surface of an underground mine,

(b) at locations near to a work area of a surface mine, with separate provisions for males and females as prescribed under sub-regulation (3), and

(c) are proportionate in size to the number of persons employed in the mine.

(2) A changing room shall have

(a) sufficient lockers, cupboards or other suitable accommodation capable of being locked to enable each employee to store goods separately;

(b) adequate facilities for bathing;

(c) adequate facilities for drying clothes; and

(d) suitable toilet facilities.

(3) An adequate supply of potable water shall be provided at a convenient and safe position close to each working place.

(4) The manager of a mine or a holder of a small scale mining licence shall provide at a convenient place on the surface of the mine facilities for the storage and consumption of food in the mine.

(5) The manager of a mine or a holder of a small scale mining licence shall ensure that the mine has sufficient and suitable toilets and urinals for the use of employees of the mine and that

(a) where the number of persons employed does not exceed one hundred, there is one toilet for at most every twenty-five persons;

(b) where the number of persons employed exceeds one hundred there is one additional toilet for at most every forty persons beyond the first one hundred persons;

(c) each main working level underground has a well-lit, well ventilated and screened toilet, which is kept clean;

(d) each bucket used in an underground sanitary convenience has a close fitting lid which is fixed on the bucket while it is removed to the surface; and

(e) a toilet is accessible to each workman.

(6) A person shall not pollute the mine with faeces or misuse a sanitary facility.

(7) The person in charge of a working place or a section in a mine shall ensure

(a) that the working place or section is clean and safe; and

(b) in the particular case of an underground mine, each level, drive, cross-cut and station is clean and safe and free of any defects.

(8) The manager of a mine or a holder of a small scale mining licence shall ensure that

(a) each toilet together with its surroundings within a perimeter of ten metres is disinfected at least twice every week, and

(b) the dates of the disinfection are logged and the records are open for inspection by the inspector.

### Fire protection

#### **Regulation 517—Emergency fire procedures**

(1) The manager of a mine or a holder of a small scale mining licence shall

(a) prepare for the mine emergency fire procedures;

(b) have installed for the mine an effective fire alarm system to warn workers of a fire;

(c) keep posted at a conspicuous place in the mine the emergency fire procedures or extracts of the procedures, and a notice explaining the alarm system in the mine;

- (d) ensure that each worker is educated on the fire procedures and the alarm system;
  - (e) ensure that a fire alarm test of the procedures is conducted at least once every six months during each production shift; and
  - (f) ensure that each senior mine official, foreman and headman is trained in the procedure to follow in case of fire.
- (2) The manager of an underground mine shall ensure that subject to Sub-regulation (3) the fire alarm system in the mine
- (a) introduces eucalyptus oil or stench gas or similar gas into the ventilation system or the main compressed air supply in a manner that is readily detectable by each worker; and
  - (b) is kept ready for immediate use.
- (3) Where the use of eucalyptus oil or stench gas or other similar gas is not practicable as an alarm system, the manager of the mine shall provide an alternative alarm system which is approved by the Chief Inspector of Mines.
- (4) The manager of a mine shall send a report of each test of a fire alarm to the Chief Inspector of Mines.

#### **Regulation 518—General provisions regarding fire protection in mines**

- (1) The manager of a mine or a holder of a small scale mining licence shall ensure that
- (a) refuse is not allowed to accumulate in the mine and is removed from the workings at least once a week and disposed off in a suitable manner;
  - (b) suitable fire extinguishers are provided at electrical installations which include sub-stations, switch houses, battery charging stations, electric winder houses and other fire hazard areas; and
  - (c) fire extinguishing equipment, fire suppression systems, fire hydrants and fire doors are inspected by a competent person at least once each month.
- (2) The person who conducts an inspection under sub-regulation (1) shall submit a report on the inspection to the manager of the mine who shall keep a record of each inspection
- (3) The manager of a mine or a holder of a small scale mining licence shall ensure that a general fire fighting drill is carried out at least once in every six months and all senior mine officials, foreman and headmen are trained in the procedure to follow in case of fire.

#### **Regulation 519—Fire protection underground**

- (1) The manager of a mine or a holder of small scale mining licence shall ensure that waste timber in underground workings in the mine is not allowed to decay but is removed as soon as practicable to the surface.
- (2) A person shall not light a naked flame or smoke a tobacco product or any other substance that burns underground in a mine.



(3) The manager of a mine and a holder of a small scale mining licence shall ensure that each intake and return airway underground in the mine is clearly marked and bears a sign-post.

#### **Regulation 520—Fan houses**

The manager of a mine or a holder of small scale mining licence shall ensure that a structure housing a fan used in connection with a ventilation system for an underground mine is constructed with non-combustible material.

#### **Regulation 521—Fire hazard areas**

(1) The manager of a mine or a holder of a small-scale mining licence shall ensure that a fire hazard area is identified by a suitable warning sign.

(2) A person shall not light a naked flame or use a substance that generates heat in a fire hazard area in a mine unless special precautions are taken and there are written instructions issued in relation to naked flames and heat generating substances.

#### **Regulation 522—Procedures in case of encounter of flammable gas**

(1) Where a person working in a mine encounters a flow of flammable gas in a drill hole underground in the mine or in an enclosed building housing a diamond drill on the surface of the mine that person shall immediately inform the manager of the mine through that person's supervisor who shall ensure that,

(a) the affected area is evacuated;

(b) precautions are taken to prevent inadvertent entry of a person into the area;

(c) the area is tested by a competent person; and

(d) the area is designated a fire hazard area.

(2) Where flammable gas occurs frequently in a mine, the manager of the mine shall advise each person working in the mine underground or each person working with diamond drill on the surface of the mine of

(a) the probability of encountering a flow of flammable gas; and

(b) the measures and procedures required to be taken or followed under subregulation (1).

#### **Regulation 523—Use of blow torch, welding, cutting and other similar equipment**

(1) The manager of a mine or a holder of a small scale mining licence shall ensure that in the mine

(a) where a blow torch, welding, cutting or other similar equipment is used underground, or in a head frame or other surface building in which a fire may endanger the fire entrance or the underground workings, a procedure for the safe use of the equipment is prepared in writing and signed by the manager or holder;

(b) a competent person or a person acting under the authority of a competent person is the only person allowed to use a blow torch or welding, cutting or other similar equipment; and

(c) despite subregulation (1), each supervisor issues instructions on the use of each equipment before the equipment is used.

(2) The written instructions shall contain information on

(a) the particular type of work;

(b) the location of the work;

(c) when the work is to be done; and

(d) any special measures and procedures to be taken before, during and after the work.

(3) Where a person working in a mine uses an equipment in a shaft, a timbered area or a fire hazard area in the mine, that person shall

(a) wet the area adjacent to the particular work place

(i) before the work begins, and

(ii) when the work is stopped and the person using the equipment intends to leave;

(b) examine the area adjacent to the particular work place for potential fire hazards

(i) before the work begins,

(ii) when the work is stopped and the person intends to leave the place of work, and

(iii) on at least one other occasion approximately two hours after the work is stopped;

(c) ensure that fire fighting equipment suitable for extinguishing a potential fire is available; and

(4) The manager of a mine or a holder of a small scale mining licence shall ensure that each worker is protected from fumes, vapours or gases by,

(i) adequate ventilation, or

(ii) the wearing of respirators.

(5) Subregulation (1) does not apply to hot work performed in a repair station or a garage in the mine if the work is protected by a fire suppression system.

(6) Paragraph (a) of subregulation (3) does not apply where the wetting is likely to create a hazard because of the presence of electrical equipment.

#### **Regulation 524—Fire Fighting preparedness**

A manager of a mine or a holder of a small scale mining licence shall ensure that a suitable number of the persons who work in the mine are trained in fire fighting procedures and

(a) the names of these workers are posted in a conspicuous place in the mine;

(b) the workers are tested for proficiency at least once a year; and

(c) a written report of the results of the tests is prepared and kept on file.

#### **Regulation 525—Fire fighting equipment**

(1) A manager of a mine or a holder of a small scale mining licence shall

(a) provide fire extinguishing equipment of a suitable type and size in the mine;

(b) where the mine has large surface facilities at more than one place, provide fire trucks in the mine;

(c) provide for each surface installation and processing plant, an independent fire fighting water pipeline, equipped with fire hydrants, hoses and accessories and two independent pumps;

(d) appropriate fire fighting equipment in each fire prone area underground;

(e) provide and maintain in the mine, a fire fighting water pond or tank with a capacity of not less than one hundred and fifty cubic metres; and

(f) provide special fire fighting equipment for each electrical equipment.

(2) A manager of the mine or a holder of a small scale mining licence shall ensure that a competent person inspects each fire extinguishing equipment, fire suppression system and fire hydrant in the mine at least once each month and submits a report on the inspection to the manager or holder.

#### **Regulation 526—Self-rescuers for underground workers**

A manager of a mine or a holder of a small scale mining licence shall ensure that a person who enters an underground mine is trained to use and equipped with a self-contained self-rescuer, approved by the Chief Inspector of Mines.

#### **Regulation 527—Emergency evacuation plans for underground mines in case of fire**

(1) A manager of an underground mine shall

(a) establish an emergency fire evacuation plan which shall be approved by the Chief Inspector of Mines; and

(b) ensure that the design of the ventilation circuit and the emergency evacuation plan shall enables a worker underground to reach a safe area within the operating time of the worker's self-rescuers.

(2) For the purposes of this regulation a safe area is a fresh air intake roadway which is not affected by the mine fire.

(3) Where in a section of an underground mine, the evacuation time is likely to be longer than the operating time of the self-rescuer, the manager of the mine shall provide a permanent refuge bay or alternatively a manufactured refuge chamber for that section of the mine.

(4) A permanent refuge bay provided under subregulation (4) shall

(a) be equipped with fresh air supply through a compressed air pipe;

- (b) be situated at a central point not more than a thirty minutes walk from a working place;
  - (c) be clearly demarcated on the mine plans under regulation 57;
  - (d) be separated from the mine ventilation system by a wall and a sealable access door;
  - (e) be ventilated by a compressed air column of at least fifty millimetres in diameter and a silencer which is fitted with a control valve at the back of the permanent refuge bay;
  - (f) be capable of generating a positive air pressure inside the permanent refuge bay more than the surrounding mine ventilation system;
  - (g) be adequately illuminated;
  - (h) have a sanitary ablution facility;
  - (i) have a telephone that can be used to communicate with the bank or the surface rescue station;
  - (j) have sufficient seating and drinking water to sustain the maximum number of workmen that would make use of the permanent refuge bay for five days; and
  - (k) contain a stretcher and first aid kit.
- (6) A manufactured refuge chamber provided under sub-regulation (5) shall have compressed air supply from a cylinder or a carbon dioxide and carbon monoxide scrubbing system to allow operation on a stand-alone basis.

#### **Regulation 528—Filling of fuel tanks in buildings**

A manager of a mine or a holder of a small scale mining licence shall ensure that in the mine

- (a) the fuel tank of an internal combustion engine which is installed in a building is located at a point outside the building and the fuel is channelled to the tank in a tightly jointed pipe or conduit; and
- (b) the air displaced from the fuel tank is channelled to a safe point outside the building before being discharged into the atmosphere.

#### **Regulation 529—Storage of dangerous, flammable or explosive material**

A manager of a mining plant shall ensure that a dangerous, flammable or explosive material or substance in a solid, liquid or gaseous state, or any combination of these, other than explosives, in the plant

- (a) is kept in an appropriate and secure container which
  - (i) has a label which identifies the material or substance and which warns of the hazard involved in the use of the material or substance; and
  - (ii) is kept apart or insulated from any source of ignition or temperature that is likely to cause combustion; and
- (b) which is not intended for immediate use, is kept, stored or handled,
  - (i) in a location outside the plant,

- (ii) in a building not used for any purpose, and
- (iii) in a well ventilated and fire resistant compartment.

**Regulation 530—Processes likely to produce flammable gas, vapour or dust**

A manager of a mining plant shall ensure that a process which is likely to produce gas, vapour, dust or fume to an extent that is likely to create a flammable mixture with air is carried out in an area which

- (a) is isolated from other operations;
- (b) has a system of ventilation which removes the gas, vapour, dust or fume;
- (c) has no potential sources of ignition; and
- (d) has vents, baffles, chokes, dampers or other means to reduce the effects of an explosion.

First aid

**Regulation 531—First aid stations at mines with more than fifty persons working**

A manager of a mine or the holder of a licence to mine which employs more than fifty persons at a time shall ensure that the surface of the mine is provided with

- (a) an adequate number of first aid stations approved by the Chief Inspector of Mines and which are
  - (i) of adequate size and easily accessible;
  - (ii) used only for work connected with first aid and clearly marked to that effect on the door;
  - (iii) equipped with a self draining sink, soap, towels and a constant supply of drinking water and hot and cold running water among others;
  - (iv) equipped with an operative communication system;
  - (v) fitted with adequate lighting and ventilation;
  - (vi) properly maintained and the interior surfaces of which are constructed in a manner that ensures proper maintenance;
  - (vii) provided with an adequate number of stretchers with at least two blankets for each stretcher, a suitable table, benches, chairs and suitable clothes for use by first aid attendants; and
  - (viii) provided with sufficient supply of dressings for the first aid treatment of accidents, burns, and other injuries likely to occur and with the dressings maintained in good condition, kept complete, readily available for use and in a container which is capable of being transported to the scene of an accident or to a place where an injured person is located; and
- (b) sanitary facilities near each first aid station which are kept clean and well lit.

**Regulation 532—First aiders at first aid stations**

A manager of a mine or a holder of a small scale licence shall appoint competent persons to manage the first aid stations and the persons appointed shall

- (a) be persons each of whom holds a valid certificate in first aid issued by a recognised society approved by the Chief Inspector of Mines;
- (b) be readily available at all times when on duty; and
- (c) record in a book provided for the purpose, particulars of each case treated specifying the date and time, the name of the injured person, the nature of the injury or illness, the treatment given and the name of the person who administered the treatment.

**Regulation 533—First aid stations at mines with less than fifty persons**

A manager of a mine or a holder of a small scale mining licence in respect of which a mine which employs less than fifty persons shall provide

- (a) on the surface of the mine a suitable shelter where first aid may be administered; and
- (b) the shelter with a stretcher, at least two blankets, splints, drinking water and an adequate supply of dressings for the first aid treatment of accidents, burns, or other injuries which may occur, and sub paragraph (viii) of paragraph (a) of regulation 531 apply to the dressings required by this sub-regulation.

**Regulation 534—Certified first aiders**

A manager of mine or a holder of a small scale mining licence shall ensure that in each operating section or department in the mine where the work undertaken is likely to cause injury to a person, at least one of the persons working in that operating section or department in the mine, holds a valid first aid certificate granted by a society approved by the Chief Inspector of Mines.

**Regulation 535—Ambulance**

A manager of a mine or the holder of a small scale mining licence shall provide suitable transport to convey a person who becomes sick or injured whilst at work in the mine to the nearest hospital.

**Regulation 536—First aid equipment**

A manager of an underground mine shall ensure that

- (a) a stock of fitted first aid boxes, dressings, splints, stretchers, and other materials as the inspector required are kept and maintained at a suitable in the mine;
- (b) each first aid equipment is used only for the purpose for which it is provided;
- (c) each vehicle and mobile equipment in the mine is equipped with a first aid box; and

(d) an electrical substation in the mine has a specific first aid kit for each injury caused by electricity and each electrician in the mine carries this specific first aid kit at each given time.

**Regulation 537—Antidotes, eyewash fountains and showers**

A manager of a mine or a holder of a licence to a small scale mine in which a poisonous or dangerous compound, solution or gas is present shall ensure that

- (a) there are installed in a conspicuous place near the compounds, solutions or gases;
  - (i) antidotes and washes;
  - (ii) eyewash fountains;
  - (iii) where necessary showers for treating injuries received from the compounds, solutions or gases; and
- (b) proper labels and directions for use are affixed to the antidotes and washes.

**Regulation 538—Medical attendance and conveyance of injured person**

A manager of a mine or a holder of small scale mining licence shall ensure that

- (a) an employee of the mine or prospecting operation who is
  - (i) sick or injured in the course of duty in the mine receives first and treatment immediately; or
  - (ii) injured in the course of duty in the mine is sent to the nearest health facility or where the injury does not permit removal of the injured person to the nearest health facility or medical practitioner is brought the mine to attend to that employee, or
- (b) an employee who is injured and is unable to proceed to that employee's residence or to a health facility personally, is conveyed to that employee's residence or a health facility in a safe and quick manner; and
- (c) payment is made by that manager or holder for the cost of transportation of the injured employee to the employee's residence or to a health facility.

**Regulation 539—Provision of health facility**

A manager of a mine or a holder of a small scale mining licence shall

- (a) where more than one hundred and fifty persons are employed in the mine,
  - (i) provide a health facility and
  - (ii) employ the services of a medical doctor for the mine; and
- (b) where less than one hundred and fifty persons are employed in the mine, and the mine does not have a health facility, arrange with the nearest health facility for the provision of medical services.

## Miscellaneous

### **Regulation 540—Abstracts of Regulations to be posted**

(1) A manager of a mine or a holder of a small scale mining licence shall

(a) post abstracts of the portions of these Regulations that directly concern persons who work in the mine, prominently in a conspicuous place in the mine,

(b) ensure that each supervisor has a copy of these Regulations or of the relevant abstracts of these Regulations; and

(c) ensure that where a posted copy of these Regulations or abstract becomes defaced, obliterated or destroyed, that copy is replaced immediately.

(2) A person who pulls down or otherwise defaces a copy or an abstract of the Regulations commits an offence and is liable on summary conviction to a fine of not more than five hundred penalty units or a term of imprisonment of not more than three years or to both.

(3) A manager shall ensure that an employee of the mine who is unable to read is orally educated on the provisions of the abstract of these Regulations which pertain to the occupation and duties of that employee.

### **Regulation 541—Delegation, possession of employment card or token**

(1) A person working in a mine shall not assign that person's responsibilities in the mine to another person except with the authorisation of the manager of the mine or the holder of the licence.

(2) A person shall not, for the purposes of working in a mine, have in that person's possession an employment card or a token for work in the mine that has not been issued by the manager of the mine or the manager's representative or the holder of the licence.

(3) A manager of a mine or a holder of a small scale mining licence shall ensure that an unauthorized person does not enter the mine and a notice to this effect shall be posted at each entrance to the mine.

### **Regulation 542—Suitable shelter to be provided near the entrance of each shaft**

A manager of a mine or a holder of a small scale mining licence shall, except where exempted by the Chief Inspector of Mines in writing provide, a suitable shelter at or near the entrance of each shaft, adit or portal for employees of the mine.

### **Regulation 543—Personal protective equipment**

(1) A manager of a mine or a holder of a small scale mining licence shall provide personal protective equipment for each employee of the mine and the manager or the holder is responsible for the use of the equipment.



(2) A person shall not enter or remain in, or permit or cause another person to enter or remain in a hard hat area of a mine, unless that person or that other person wears a hard hat in good condition and of a type approved by the Chief Inspector.

(3) Each person who works in a mine or who enters a mine shall wear a pair of boots or shoes which have protective toes, as approved by the Chief Inspector.

(4) A person who works in an area of a mine where there is danger of eye injury shall wear a pair of goggles in the course of duty.

(5) A manager of a mine or a holder of a small scale mining licence shall ensure that each person who works in the mine wears or uses the personal protective equipment, clothing or device approved by the Chief inspector of Mines for each hazard in the mine.

#### **Regulation 544—Persons infected with tuberculosis prohibited from entering underground mine**

A manager of a mine or a holder of a small scale mining licence shall ensure that a worker who is diagnosed with tuberculosis does not enter the underground workings of the mine.

#### **Regulation 545—Entering of chute prohibited**

(1) A person shall not enter a chute, ore pass, sand pass, raise, shaft, or box-hole in a mine, to release or blast a choke.

(2) A person working in a mine shall remove a choke in the mine in a safe manner.

#### **Regulation 546—Obligation of manager to prepare special rules on request**

(1) An inspector may by notice in writing as set out in Form Thirty-Nine of the First Schedule request the manager of a mine or a holder of a small scale mining licence to submit to the Chief Inspector of Mines special rules for the

(a) prevention of accidents or dangerous occurrences, and

(b) provision of health, safety, convenience and proper discipline of the persons employed in the mine

(2) A manager of mine or a holder of a small scale licence shall comply with a request by the Chief Inspector of Mines in sub-regulation (1).

(3) The Chief Inspector of Mines may approve the special rules either as a whole or in part with the appropriate amendments.

(4) The Chief Inspector shall give notice in writing of the approval to the manager or holder.

(5) The manager or the holder shall keep copies of the special rules as part of the records of the mine in the mine and an inspector shall have access to those rules.

### **Regulation 547—Training programme for workers**

- (1) The manager of a mine or a holder of a small scale mining licence shall
  - (a) develop a written programme for the training of workers in the mine;
  - (b) ensure that each worker is adequately trained to discharge that worker's duties safely; and
  - (c) appoint a competent person to manage the training programme.
- (2) A training programme shall specify,
  - (a) the content of the training required; and
  - (b) the time required for the training.
- (3) The person appointed to direct the training programme shall
  - (a) keep a record of the training provided to each worker; and
  - (b) make a copy of the record readily available to workers.
- (4) A manager or a holder shall ensure that a person who provides training as part of the training programme.
  - (a) is competent to provide the training; and
  - (b) has adequate time and facilities to provide the training.
- (5) Where a worker in a mine has previous training equivalent to the training required by the training programme, the person who manages the training programme may accept the previous training as wholly or partly satisfying the requirements of the training programme.
- (6) A manager of a mine or a holder of a small scale mining licence shall ensure that each person employed in the mine undergoes periodic retraining.

### Mine rescue brigade for underground mine

#### **Regulation 548—Rescue brigades**

- (1) A manager of a mine or a holder of a small scale mining licence shall organise and maintain in the mine a rescue brigade in each mine.
- (2) Each rescue brigade shall consist of not less than five fully trained persons including one person who shall act as captain of the brigade.
- (3) Each rescue brigade shall be organized and maintained as follows:
  - (a) where the total number of persons employed underground is not more than fifty, there shall be one brigade;
  - (b) where the total number of persons employed underground is at least fifty and at most one hundred and fifty, there shall be two brigades;
  - (c) where the total number of persons employed underground is not less than one hundred and fifty and not more than five hundred, there shall be at least three brigades;

(d) where the total number of persons employed underground is not less than five-hundred but less than two thousand there shall be at least four brigades; and

(e) where the total number of persons employed underground is not less than two thousand there shall be at least five brigades.

(4) A manager of a mine or a holder of a small scale mining licence in respect of a mine in which the total number of persons employed underground is less than fifty, shall be deemed to have complied with sub-regulation (1), if that manager or holder has made arrangements with the management of a neighbouring mine for the assistance of rescue brigades to the satisfaction of the Chief Inspector of Mines

(5) A manager of a mine or a holder of a small scale mining licence shall

(a) as far as is practicable not employ all the members of the rescue brigade underground at the same time;

(b) ensure that each member of a rescue brigade attends at least twelve practices in each year, six of which are held underground;

(c) give notice in writing to the Chief Inspector of Mines of the details of the practices and the details shall include the location of the practice, nature of work to be performed, names of brigade members involved, and the schedule of the practice; and

(d) develop a system which ensures that the location of each person in a working shaft collar in the mine is known at each time and the system used shall be one approved by the Chief Inspector of Mines.

#### **Regulation 549—Rescue apparatus**

(1) Where a person is employed underground in a mine, the manager of the mine or the holder of a small scale mining licence in respect of the mine shall provide a sufficient number of approved rescue breathing apparatus in the mine except where the Chief Inspector of Mines grants an exemption to this requirement in writing.

(2) Each member of rescue brigade shall have access to at least one rescue breathing apparatus.

(3) The Chief Inspector shall approve the use of a particular rescue breathing apparatus

#### Duties of workmen regarding safety

#### **Regulation 550—General duties of workmen**

(1) Each person employed in a mine shall take reasonable care to ensure that the health and safety of that person and of any other person employed in the mine is not adversely affected through an act of that person.

(2) A person employed in a mine shall co-operate with the manager of the mine or the holder of a small scale mining licence in respect of the mine in the discharge of the relevant obligations under these Regulations.

(3) An employee is not liable for a contravention of this regulation where the employee does an act at the direction of a supervisor.

#### **Regulation 551—Damage to safety equipment**

(1) A person shall not without the consent of the manager of the mine or the holder of the licence to the mine damage, alter, remove or in any way render useless equipment or an arrangement which has been provided for the protection of the mine or for the safety or workmen.

(2) A person who contravenes sub regulation (1) commits an offence and is liable on summary conviction to a fine of not more than one thousand penalty units or a term of imprisonment of not more than five year or to both.

#### **Regulation 552—Obedience to orders and instructions**

A person who fails to obey

(a) an order given in accordance with a requirement under these Regulations by a person lawfully authorised to give the orders; or

(b) an instruction which is in the interest of safety or discipline, approved by the Chief Inspector of Mines in writing, and posted or caused to be posted by the Manager or holder at any place in the mine;

commits an offence and is liable on summary conviction to a fine of not more than five hundred penalty units or a term of imprisonment of not more than three years or to both.

#### **Regulation 553—Acts prejudicial to safety or discipline**

A person who negligently or wilfully

(a) does an act which is likely to endanger the safety of the mine or the safety or health of persons in a mine, or

(b) omits to do at a mine, a necessary act which secures the safety of the mine or the safety or health of persons in the mine commits an offence and is liable on summary conviction to a fine of not more than five hundred penalty units or a term of imprisonment of not more than three years or to both.

#### **Regulation 554—Conflict between these Regulations and an agreement**

Where there is a conflict between these Regulations and an Agreement, these Regulations shall prevail.

### **Regulation 555—Intoxicating liquor or drugs**

(1) A person who takes intoxicating liquor or psychotropic drugs into the workings of a mine or to any place of work in the mine commits an offence and is liable on summary conviction to a fine of not more than five hundred penalty units or a term of imprisonment of not more than three years or to both.

(2) Where the manager of a mine or a holder of a small scale mining licence to a mine suspects that a person working in the mine is intoxicated or in a condition which is likely to render that person incapable of taking due care in the discharge of the duties of that person, the manager or holder shall not permit that person to enter the mine or to be in proximity to a working place or near to a machinery in motion in the mine.

(3) A person shall not work or enter a mine if that person is

(a) under the influence of a drug unless the drug has been prescribed by a medical practitioner or the drug is generally available for legal use; or

(b) under the influence of a drug which is prescribed by a medical practitioner or which is generally available for legal use but the use of that drug could impair the ability of that person to work safely in the mine.

(4) A person who enters a mine under the influence of drugs commits an offence and is liable on summary conviction to a fine of not more than five hundred penalty units or a term of imprisonment of not more than three years or to both.

### **Regulation 556—Fighting or unlawful assault**

(1) A person shall not take part in a fight or unlawfully assault another person in a mine.

(2) A person who contravenes sub-regulation (1) commits an offence and is liable on summary conviction to a fine of not more than five hundred penalty units or a term of imprisonment of not more than three years or to both.

### **Regulation 557—Sleeping in mine prohibited**

(1) A person shall not sleep whilst on duty in a mine.

(2) A person who contravenes sub-regulation (1) commits an offence and is liable on summary conviction to a fine of not more than five hundred penalty units or to a term of imprisonment of not more than three years or to both.

### **Regulation 558—Prohibition of naked flame**

A person shall not use a naked flame in a mine.

### **Regulation 559—Consequences if workmen do not wear personal protective equipment**

(1) A person who fails to wear an appropriate protective gear in a mine, commits an offence.

(2) Where that person gets injured as a result, that person is deemed to have contributed to the injury.

(3) A person who commits an offence under sub-regulation (1) is liable on summary conviction to a fine of not more than two hundred and fifty penalty units or a term of imprisonment of not more than two years or to both.

### **Regulation 560—Interpretation**

In these Regulations, unless the context otherwise requires

"abnormal and emergency conditions" means abnormal conditions - cyanide leaks, deviations from routine tasks or procedures;

"aerial ropeway" means an installation to carry bulk material in buckets suspended and moved on overhead ropes supported by towers (trestles);

"alluvial" means ground containing minerals found in detritus resulting from the disintegration of older deposits whose constituents have been brought into their present position by mechanical agencies;

"authorised person" means a person authorised by the Minister or Chief Inspector of Mines to exercise any power or function under these Regulations;

"boiler" means any apparatus adopted to the continuous conversion of any liquid into steam, vapour or gas, and includes any part of the apparatus that is capable of being so adapted by the closing of stop-valves or stop-cocks, and the fittings and appurtenances of the apparatus;

"buddy" means one of the two fully trained and competent individuals assigned to work in a cyanide equipment area but who remains outside the hazard or work area and observes the person inside the hazard or work area and who responds to emergency situations in which the person inside the hazard or work area is exposed to cyanide or cyanide action products;

"building and industrial minerals" means barite, basalt, clay, dolomite, feldspar, granite, gravel, gypsum, laterite, limestone, mica, magnesite, marble, phosphate, rock, salt, sand, sandstone, slate and talc when mined for use in Ghana for agriculture, building, road making or industry and such other minerals as the Minister may from time to time declare, by notice in the Gazette, to be building and industrial minerals when so mined;

"cessation" means arrest, failure, or stoppage;

"Chief Inspector or Chief Inspector of Mines" means the person appointed as Chief Inspector of Mines in compliance with Section 102 (1) and 111(1) of Act 703;

"competent person" an individual who is qualified by virtue of that person's knowledge, training, skills and experience to organise the work and the performance of the work and is familiar with the provisions of the relevant legislation and the regulations which apply to the work to be performed;

"confined space" means a space that

(a) is large enough and so configured that an employee can physically enter and perform assigned work;

(b) has a limited or restricted means for entry or exit and has little or no natural ventilation, and comprise among others tanks, sumps, elution columns, cyanide storage vessels or bins, leach vessels, CIP tanks, and eluate tanks; and

(c) is not designed for continuous employee occupancy;

"controlled spillage" means a situation where an amount of cyanide is spilled, contained and safely disposed of into a designated area;

"cyanide" includes cyanide contained either as cyanide in gas phase (HCN(g)), cyanide in liquid phase whether free or complexed and insoluble forms of cyanide;

"cyanide reaction products" means the by-products of cyanide reaction with any other chemical, and comprise among others; CN<sup>-</sup>, HCN, WAD and SAD complexes;

"dam" includes

"cyanide solid or liquid" include products of cyanide supplied to metallurgical treatment facilities and existing in solid or liquid form until point of entry into the pulp or solution process streams;

(a) any artificial depository of water; and

(b) any construction for the retention of tailings and waste products of mining, quarrying or mineral processing operations;

"detoxification" means removal of all traces of cyanide from tools and equipment by means of washing, scraping or other physical cleaning and the complexing of cyanide effluents generated during this process;

"District Assembly" includes Metropolitan and Municipal Assemblies;

"dredge" means any floating vessel used for—

(a) mining operations consisting of digging, cutting, excavating or raising (whether by mechanical, hydraulic or pneumatic means) any rock, metal, mineral or mineral substance from below the surface of a body of water (whether natural or artificial); or

(b) the purpose of treating or otherwise dealing with any rock, metal, mineral or mineral substance that has been dug, cut, excavated or raised as provided in paragraph (a), but does not include;

(c) any floating vessel used for marine or aquatic engineering works, harbour works or land reclamation works; or

(d) any barge, workboat, tender, anchor punt or other vessel ancillary to a floating vessel used for a purpose referred to in paragraph (a) or (b);

"drive" means a lateral excavation used as an access in a mine;

"drugs" means as specified in the Narcotics Drugs Act;

"dyspnoea" means laboured breathing;

"earth" means any rock, stone, quartz, clay, sand or soil;

"effluent solution" means cyanide containing solution with a cyanide concentration higher than that allowed for potable water;

"electrical apparatus" includes all apparatus, machines, and fittings in which conductors of electrical current are used or of where they form a part;

"elevator" means a lifting device consisting of a platform or cage that is raised and lowered mechanically in a vertical shaft in order to move material from one floor to another in a building;

"emergency conditions" include cyanide spillages, human or environmental exposures to cyanide or cyanide reaction products;

"environmental emergency" means an emergency condition that occurs outside the plant boundary;

"excavation" means any cavity in or about a mine, quarry or works, and includes any shaft, winze, drive, raise and all passages and workings in a mine or quarry;

"explosives" means explosive within the meaning of the Minerals and Mining (Explosives) Regulations 2012 (L.I. 2177);

"facilitated emergency evacuation" means a set-up or mock exercise aimed at mimicking a true potential emergency;

"free cyanide" means the sum of HCN (aq) and CN-uncomplexed.

"fresh air base" means any place underground where the ground is competent and the ambient air is not polluted and suitable for breathing;

"gold mine facility or metallurgical treatment facility" means a facility where processing of gold bearing material occurs and dissolution is obtained through the use of cyanide;

"hazchem" means a hazardous chemical response unit, properly trained and equipped to deal with major chemical spills;

"HDPE" means high density, (0.95-0.965 t/m<sup>3</sup>) polyethylene.

This material has high stiffness, high temperature resistance and good water vapour barrier properties;

"holder" means the holder of a mineral right under the Minerals and Mining Act, 2006 (Act 703);

"inspector" means an inspector of mines, inspector of machinery, inspector of environment or other technical areas, appointed under this regulation or under any repealed law, being an employee of the Inspectorate Division of the Minerals Commission;

"inspecting engineer" means the person appointed to be responsible for the regular inspection of machinery and equipment of a mine, quarry, works or associated plant having less than 750 kW of installed power;

"Inspectorate Division" means the Inspectorate Division of the Minerals Commission established by section 101 of the Minerals and Mining Act, 2006 (Act 703);

"lifting machine" means an apparatus used to raise, lower or to transport heavy loads for limited distances;

"local community" means a residents of a place in mine villages, residents of a place on or within mine boundaries and residents living close to the potential impact area of cyanide;



"Manager" means the person appointed to be responsible for the control, management and direction of a mine or a quarry or a portion of a mine, quarry or works;

"manager of a mine" means a competent person appointed in terms of these Regulations, to be responsible for the control, management and direction of a mine;

"manager of metallurgical treatment facility" means a competent person appointed in terms of these Regulations, to assist the manager of a mine to control, manage and direct the operation of a metallurgical plant";

"machinery" means every kind of mechanical appliance, and all electrical apparatus of whatsoever kind in use at a mine or works;

"mine" when used as a noun, means any place, excavation or working wherein, whereon or whereby any operation connected with mining is carried on together with all buildings, premises, erections and appliances belonging or appertaining thereto above and below the ground for the purpose of winning, treating or preparing minerals, obtaining or extracting any mineral or metal by any mode or method or for the purpose of dressing mineral ores, and includes a quarry where building and industrial minerals are mined;

"mine" when used as a verb, means to win minerals intentionally, and includes any operations directly or indirectly necessary or incidental thereto, and "mining" shall be construed accordingly;

"mineral" means any substance in solid or liquid form occurring naturally in or on the earth, or on or under the seabed, formed by or subject to geological processes, including building and industrial minerals but excluding petroleum (as defined in the Petroleum (Exploration and Production) Law, (P.N.D.C.L. 84) and water;

"mining" means winning minerals intentionally, and this includes quarrying;

"mine products" means any mineral, ores containing minerals or concentrated ores or minerals that have been extracted from or produced by a mine;

"mineral right" means a right to reconnoitre, prospect for or mine minerals given by the Minister in the form of a reconnaissance licence, a prospecting licence, a mining lease a restricted reconnaissance licences, a restricted prospecting licence or a restricted mining lease issued under the Mining and Minerals Act, 2006 (Act 703);

"mining purposes" means the purpose of

(a) searching for or obtaining any mineral from the earth by any mode or method of mining; and

(b) stacking or otherwise storing any earth or ore containing any mineral;

"Minister" means the Minister responsible for mines;

"off-loading hazardous area" means an area or spray risk area in which off-loading takes place between the road and the facility or an area determined by risk assessment typically 7.5 metres radius around the tanker, the tanker off-loading point, along the length of the hose and around the inlet point of the facility, including the pump;

"Owner" means

(a) in relation to a mine or quarry

(i) the holder of the mineral right on which the mine or quarry is situated; or

(ii) the holder of a sublease or such mineral right; or

(iii) a person in possession of such mineral right with the consent of the holder; and

(b) in relation to works or processing plant - the lessee, or person in possession with the consent of the lessee, of the land on which the works or processing plant is situated;

"plan" means an original plan or section and includes a correct copy of tracing of an original plan or section;

"prospect" means to search for mineral intentionally and includes operation to determine the extent and economic value of any mineral deposits;

"quarry" means a surface excavation made in the earth for the purpose of extracting stone, gravel, rock or any other industrial mineral;

"radio-active mineral" means a mineral which contains by weight at least one-twentieth of one percent (0.05 per cent) of uranium or thorium or any combination thereof;

"raise" means any vertical or inclined excavation or opening from underground workings in a mine;

"ramp" means any tunnel at an inclination or more than five degrees above the horizontal in which self-propelled trackless vehicles move;

"reef" means a vein, lode, or deposit other than surface alluvial ground;

"redundant equipment": means equipment or material which is defective and can no longer be used as part of the metallurgical process;

"refuge bay" means a demarcated clean and safe place in an underground mine that is situated at a central point not more than thirty minutes walk from any working place which is separated from the mine ventilation system by means of a wall or walls and sealable access door and is ventilated by means of compressed air;

"resident engineer" means a person who is the holder of an appropriate mechanical or electrical engineers certificate and appointed to be responsible for the installation, commissioning, operation and decommissioning of machinery and equipment of a mine, quarry, works or associated plant

"responsible person" means the person appointed to be in charge of a specific work;

"risk assessment" means a systematic analysis of the major risks in a workplace which have the potential to cause harm;

"safety pillar" means every portion of a reef, mineral deposit or ground left in situ for support and protection of

(a) the surface; and

(b) any structure, plant, dam, lake, road, railway or excavation on the surface; or

(c) any underground workings including shafts and inclines;

"shaft" means any vertical or inclined passage equipped with winding plant;

"small scale mining" means a mining operation under a small scale mining licence

"spillage" means the accidental discharge of concentrated cyanide, cyanidation slurry or spent cyanide solution from a tanker, vessel or pipeline into any area which is not a storage or process tank or a tailings dam and discharges into bund areas, spillage sumps and catchment ponds;

"State" means the Republic of Ghana;

"steeply inclined" in connection with shafts, raises, winzes or other underground excavations means any inclination to the horizontal of more than thirty five degrees;

"stope" means a working in which a section or block of ore, which has been opened up by means of levels and their connections, is mined;

"subcutaneous" means under the skin;

"surface mine" means a mining operation on the surface for the purpose of winning a mineral but excludes any dredging operation;

"scrap material" means equipment or material which is damaged, irreparable or hazardous and has been identified for disposal;

"tailings storage facility" means an impoundment, where residue from metallurgical processing, mainly comprising finely ground rocks, is disposed off;

"tanker part brake" means a device which applies the tanker part brakes and activates the air padding valve and air discharge valve;

"tell-tale hole" means a six millimetre diameter hole drilled into a blank flange bolted onto the open end of the outside of two drain valves fitted in series on the storage tank. A small stream of cyanide which allows a flow in the event that the outside valve (which is padlocked closed) begins to leak through;

"thiocyanates" means a stable decomposition product of cyanide containing small amounts of sulphur;

"Titratable cyanide" means the un- and weakly complexed CN- which reacts with silver nitrate by means of titration i.e. HCN and composes CN-uncomplexed, CN complexed with Zn and the fourth CN of  $\text{Cu}(\text{CN})_4$ ;

"total aqueous cyanide" includes the sum total of all the cyanide present in a dissolved state in liquid phase, including  $\text{HCN}(\text{aq})$ , CN- and all metal cyanide complexes but excludes derivative products  $\text{CNO}^-$  and  $\text{SCN}^-$ ;

"total solid cyanide" includes the sum of all precipitated solid phase cyanide complexes in the form among others of  $\text{CuCN}$ ,  $\text{Fe}_4[\text{Fe}(\text{CN})_6]$ ,  $\text{Cu}_2\text{Fe}[\text{Fe}(\text{CN})_6]$ ;

"tributer" means a person who is employed or contracted to win minerals by the holder of a mineral right, being a person who is allocated a working area by the Holder of a mineral right and who receives in return remuneration in accordance with the quality and quantity of the minerals won;

"Tripac-Cyano" means a cyanide antidote consisting of

(a) Amyl nitrite;

(b) Sodium thiosulphate; and

(c) Sodium nitrite;

"uncontrolled spillage" means a situation in which individuals are exposed to, or the environment is contaminated by, cyanide or cyanide products, the spillage of which is uncontrolled;

"unique flange" means a situation in which a customer off-loads coupling flange which is designed so that it is not compatible with the off-loading coupling flange of other reagents;

"WAD cyanide" includes weak acid dissociable cyanide and cyanide liberated at moderate pH of 4.5 and comprises among others HCN(aq) and CN<sup>-</sup>, the majority of ligands from Cu, Cd, Ni, Zn, Ag complexes and others with similar low dissociation constants;

"warden" means a warden appointed by the Chief Inspector under this regulation and includes a trainee warden;

"winding engine" means any machinery used for lowering or raising persons or materials in a shaft or incline in any mine, whether erected on the surface or underground;

"winze" means any vertical or inclined excavation or opening downwards from the underground workings of a mine;

"workings" means and includes all those portions of a mine which are being excavated, or have been excavated whether abandoned or not;

"works" means any operations carried on for, or incidental to, the wining or treatment of minerals whether or not connected with any mine or quarry.

#### **Regulation 561—Revocation and savings**

(1) The Mining Regulations, 1970 (LI 665) are hereby revoked.

(2) Despite the revocation under sub-regulation (1), any licence, certificate, permit or authorization issued and any registration made under the revoked enactment and which was in force immediately before the commencement of these Regulations shall continue to be in force until it expires or is revoked by the Chief Inspector or the Commission as appropriate.

## **Schedules**

*(Please note that this version of L.I. 2182 does not include the full content of the Schedules. The forms included in the Schedule are only listed and the complete forms can be obtained by contacting the Minerals Commission at: P. O. BOX M248, 9 Switchback Road Residential Area, Cantonments, Accra. Telephone: (233-302) 772783. Website: [www.ghana-mining.org](http://www.ghana-mining.org))*

### **FIRST SCHEDULE**

Form One: (Regulations 2 (5) And 22) Minerals Commission - Prohibition Notice

Form Two: (Regulations 2(6)(A) And 21) Minerals Commission - Improvement Notice

Form Three: (Regulation 4(1)) Minerals Commission - Notice of Appeal

Form Four: (Regulation 6(1)) Minerals Commission - Exploration Operating Permit

Form Five: (Regulation 6(2)) Minerals Commission - Application for Exploration Operating Permit

Form Six: (Regulation 8(1)) Minerals Commission - Mining Operating Permit

Form Six A: (Regulation 8(2)) Minerals Commission - Temporary Mining Operating Permit

Form Six B: (Regulation 8(4)) Minerals Commission - Mine Support Service Operating Permit

Form Seven: (Regulation 8(7)) Minerals Commission - Application for Mining Operating Permit

Form Eight: (Regulation 13(1)(A)) Minerals Commission - Notice Of Result Of Inspection

Form Nine: (Regulation 14(2)) Minerals Commission - Authority to Enter and Inspect a Mine

Form Ten: (Regulation 18(3)(C)) Minerals Commission - Notice of Endorsement/ Cancellation / Suspension of Permit/Certificate

Form Eleven: (Regulation 23(1)) Minerals Commission - Notice of Commencement / Recommencement / Discontinuance / Abandonment of Work

Form Twelve: (Regulation 23(9)(C)) Minerals Commission - Certificate Of Registration Of Manager

Form Thirteen: (Regulations 26(1)(D)) Minerals Commission - Personal Injury Accident Report Form

Form Fourteen: (Regulations 26(2)) Minerals Commission - Accident Report Form

Form Fifteen: (Regulation 27(1)) Minerals Commission - Monthly Report of Dangerous Occurrences

Form Sixteen A: (Regulation 28(2)(A)) Minerals Commission - Monthly Returns on Gold Mining Companies

Form Sixteen B: (Regulation 28 (2)(A)) Minerals Commission - Monthly Returns on Salt Producing Companies

Form Sixteen C: (Regulation 28 (2)(A)) Minerals Commission - Monthly Returns on Minerals Purchasing And Export Companies

Form Sixteen D: (Regulation 28 (2)(A)) Minerals Commission - Monthly Returns on Bauxite Mining Companies

Form Sixteen E: (Regulation 28 (2)(A)) Minerals Commission - Monthly Returns on Diamond Mining Companies

Form Sixteen F: (Regulation 28 (2)(A)) Minerals Commission - Monthly Returns on Manganese Mining Companies

Form Sixteen G: (Regulation 28 (2)(A)) Minerals Commission - Monthly Returns on Gold Recovered From Non-Traditional Sources – Spent Carbon, Mill Grease, Worn Out Mill Liners, Wood Chips, Other Mining Wastes

Form Sixteen H: (Regulation 28 (2)(A)) Minerals Commission - Quarterly Returns Reconnaissance/Prospecting Operations

Form Sixteen I: (Regulation 28 (2)(A)) Minerals Commission - Quarterly Returns on Gold Recovered From Non-Traditional Sources-Spent Carbon, Mill Grease, Worn Out Mill Liners, Wood Chips and Other Mining Wastes

Form Sixteen J: (Regulation 28 (2)(A)) Minerals Commission - Quarterly Returns Industrial Mining Operations

Form Sixteen K: (Regulation 28 (2)(A)) Minerals Commission - Monthly Accident/Incident Injury Statistics

Form Seventeen: (Regulation 108(2)) Minerals Commission - Notice of Discontinuance of Dumps

Form Eighteen: (Regulation 119(1)) Minerals Commission - Application for Approval for the use of a Dredge

Form Nineteen: (Regulation 119(4)) Minerals Commission - Approval for the use of a Dredge

Form Twenty: (Regulation 130(1)(A)) Minerals Commission - Application for Repair/Modification of A Dredge

Form Twenty-One: (Regulation 120(4)) Minerals Commission - Approval for the Repair/Modification of a Dredge

Form Twenty-Two: Regulation 176(4)) Minerals Commission - Application for Permission to Weaken/Cut Through/Work Shaft/Mine Pillars

Form Twenty-Three: (Regulations 189(3)) Minerals Commission - Quarterly Ventilation Report

Form Twenty-Four: (Regulation 197(2)) Minerals Commission - Permission for Exemption and Extension Of Auxiliary Ventilation

Form Twenty-Five: (Regulations 273) Minerals Commission - Notice of Discontinuance of a Tailings Dam

Form Twenty-Six: (Regulation 275(1)) Minerals Commission - Approval of Mine Closure Plan

Form Twenty-Seven: (Regulation 382(2)) Minerals Commission - Safety Factors For Overhead Lines

Form Twenty-Eight: (Regulation 411(1)) Minerals Commission - Winding Rope Records Report Form

Form Twenty-Nine: (Regulation 418) Minerals Commission - Permission for use of Rope for over 3 Years/Life of Rope

Form Thirty: (Regulation 421(1)) Minerals Commission - Application for Exemption from Providing Shaft Guides

Form Thirty-One: (Regulation 422(2)) Minerals Commission - Weekly Shaft Examination Report

Form Thirty-Two: (Regulation 438(2)) Minerals Commission - Authorisation for Replacement Of Special Shaft Signal

Form Thirty-Three: (Regulation 457) Minerals Commission - Winder Drivers Daily Report Log

Form Thirty-Four: (Regulation 462 (1)) Minerals Commission - Machinery Record Book

Form Thirty-Five: (Regulation 471 (2), 472(1)) Minerals Commission - Application for Small Scale Mining Operating Permit

Form Thirty-Six: (Regulations 472 (2)) Small Scale Mining Operating Permit

Form Thirty-Seven: (Regulation 480(1)) Minerals Commission - Rehabilitation Certificate: Small Scale Mining Operation

Form Thirty-Eight: (Regulation 514(2)(A)) Danger Warning Signs

Form Thirty-Nine: (Regulation 346 (1)) Minerals Commission - Notice to Submit Special Rules

Form Forty A: (Regulation 36(1)(D)) Minerals Commission - Certificate of Competency (Mine Manager/Mine Captain/Underground Manager)

Form Forty B: (Regulation 36 (2) And 37 (2)) Minerals Commission - Candidates for Mining Captain Certificate

Form Forty C: (Regulations 36(3)(B) And 45(5)(A)) Minerals Commission - Certificate of Mine Rescue Training

Form Forty D: (Regulations 37(1)(D)) Minerals Commission - Certificate of Competency (Mine Superintendent)

Form Forty E: (Regulation 45(3)) Minerals Commission - Candidates for Shift Boss Mining Foreman Certificate

Form Forty F: Regulations 45(2)) Certificate of Competency (Shift Boss/Mining Foreman)

Form Forty-One: (Regulation 416(1)) Minerals Commission - Winding Rope Re-Capped Form

Form Forty-Two: (Regulation 444(4)) Minerals Commission - Authorisation for Replacement of Shaft Signals

## Second Schedule

(Regulation 5): Inspectorate Division of Minerals Commission - Schedule of Fees

1. Mining Permit	GH¢450.00 for each square kilometer
2. Quarry/Restricted Mining Permit	GH¢500.00 for the first acre, any additional acre at GH¢30.00
3. Gravel and Stone Winners/sand winning	GH¢300 for the first acre; any additional acre at GH¢10.00
4. Salt/Kaolin/Clay Mining Permit	GH¢1000.00 for first acre and any additional acre at GH¢1.00
5. Limestone Mining Permit	GH¢2000.00 for first acre and any additional acre at GH¢1.00
6. Small Scale Gold/Diamond Permit	First acre GH¢350.00; any additional acre GH¢10.00 / acres
7. Prospecting Permit	GH¢3,000.00/Applicant/Concession
8. Mercury Licence (Importers and Dealers)	GH¢2,000.00
9 Mercury Licence (Industrial Users)	GH¢500.00/Company
10. Winding Engine Driver's Certificate Examination	(GH¢500.00)/Candidate
11. Mine Rescue Certificate Examination	(GH¢500.00)/Candidate
12. Shiftboss/Mine Foreman Certificate Examination	(GH¢700.00)/Candidate
13. Mine Captain/Sectional Engineer/Processing Engineer/Safety & Env. Engineer Certificate Examination	(GH¢1,000.00)/Candidate
14. Underground Manager/Mine Superintendent/Engineering Superintendent/Processing Superintendent/Safety & Env. Superintendent Certificate Examination	(GH¢1,500.00)/Candidate
15. Mine Manager/Engineering Manager/Processing Manager/Safety/Environmental Manager Certificate Examination	(GH¢2,000.00)/Candidate
16. Industrial Minerals Waybill	(GH¢30.00)/Booklet
17. Monitoring and Analytical Services	Depending on the nature of service but not less than (GH¢500.00)/Test
18. Rope Test	(GH¢2,000.00)/Test
19. Other Mechanical Test Not Specified Above	Depends on nature of Test but not less than (GH¢2,000.00)/Test
20. Pre-licensing Inspection	Depending on Nature of Service & Location, but not less than GH¢500.00
21. Pre-surrender Inspection	GH¢10,000.00/Application
22. Exemptions Permit (Underground Development)	GH¢5,000.00/Application
23. Mining Services Operating Permit	GH¢5,000.00
24. Tailings Dam/Other Embankments & Infrastructures Operating Permit	GH¢5,000.00