

VIRGINIA DEPARTMENT OF MINES, MINERALS & ENERGY

DIVISION OF MINES



**SURFACE FACILITIES FOREMAN
CERTIFICATE**

STUDY GUIDE

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Commonwealth of Virginia
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**DEPARTMENT OF MINES MINERALS AND ENERGY
DIVISION OF MINES
DISCLAIMER**

Article 3 of the Coal Mine Safety Laws of Virginia establishes requirements for certification of coal mineworkers. The certification requirements are included in §45.1-161.24 through §45.1-161.41 in which the Board of Coal Mining Examiners is established for administering the certification program. The Board has promulgated certification regulations 4 VAC 25-20, which set the minimum standards and procedures required for Virginia coal miner examinations and certifications.

The Virginia Department of Mines Minerals and Energy, Division of Mines developed this study guide to better train coal miners throughout the mining industry. The study guide material should be used to assist with the knowledge necessary for coal mining certifications. The material is not all-inclusive and should be used only as an aide in obtaining knowledge of the mining practices, conditions, laws and regulations. This material is based upon the Coal Mining Safety Laws of Virginia, Safety and Health Regulations for Coal Mines in Virginia, Title 30 Code of Federal Regulations (30 CFR), State and Federal Program Policy Manuals and other available publications. Nothing herein should be construed as recommending any manufacturer's products.

The study guide and materials are available at the Department of Mines, Minerals and Energy.

Any questions concerning the study guide should be addressed to the Regulatory Boards Administrator at the Big Stone Gap Office.

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INTRODUCTION

Article 3 of the Coal Mine Safety Laws of Virginia establishes requirements for certification of coal mineworkers. The certification requirements are included in section 45.1-161.24 through 45.1-161.41 in which the Board of Coal Mining Examiners is established for the purpose of administering the certification program. The Board has promulgated certification regulations 4 VAC 25-20, which set the minimum standards and procedures required for Virginia coal miner examination and certifications.

Each applicant for a surface facilities foreman certificate shall demonstrate to the Board of Coal Mining Examiners by written oral examination that he has thorough knowledge of shops, labs, warehouses, clear cutting and has appropriately related work experience approved by the Division of Mines. In addition, each applicant shall pass the examinations in first aid* and gas detection. The holder of a surface facilities foreman certificate issued by the Board shall be authorized to act as surface facilities foreman and clear cutting foreman. This certification shall **not** be used in lieu of the Surface Foreman, Prep Plant Foreman or Dock Foreman certifications.

*First Aid for Miners Study Guide will be used for this section requirement of the certification exam.

PURPOSED AND SCOPE

Purpose

The purpose of the Surface Facilities Foreman Certification Study Guide is to assist a qualified applicant in obtaining the Surface Facilities Foreman certification. The Board of Coal Mining Examiners (BCME) may require certification of persons who work in shops, labs, warehouses, clear cutting and persons whose duties and responsibilities in relation these areas require competency, skill or knowledge in order to perform consistently with the health and safety of persons and property.

Scope

The applicant for Surface Facilities Foreman must possess at least one year of practical mining experience and 30 days surface facilities experience under the direction of a certified surface facilities foreman or appropriately related work experience approved by the Chief of the Division of Mines. The applicant for surface facilities foreman certification must also hold a General Miner Certification and have received current first aid training (MSHA first aid 5000-23 acceptable).

The surface facilities foreman certification authorizes the holder to perform foreman and/or examiner duties at shops, labs, warehouses and clear-cutting required by State and Federal laws and regulations.

Section 1 Coal Mine Safety Laws of Virginia

45.1-161.11. Persons not permitted to work in mines.

- A. No person **under eighteen years of age** shall be permitted to work in or around any mine, and in cases of doubt, the operator, agent or mine foreman shall obtain a birth certificate or other documentary evidence, from the Registrar of Vital Statistics, or other authentic sources as to the age of such person.
- B. No operator, agent or mine foreman shall **make a false statement** as to the age of any person under eighteen years of age applying for work in or around any mine.
- C.

45.1-161.12.B.

Each miner at any mine shall comply fully with the provisions of this Act and other mining laws of the Commonwealth that pertain to his duties.

45.1-161.12.C.

Any individual shall, upon the order of the Chief, **complete training** that addresses the subject of any violation issued to the individual as a condition for abatement of the violation.

45.1-161.14.B.

The operator of any mine or **his agent shall operate his mines in full conformity with this Act** and any other mining law of the Commonwealth at all times. This requirement shall not relieve any other person subject to the provisions of this Act from his duty to comply with the requirements of this Act.

45.1-161.28. Certification of certain persons employed in coal mines; powers of Board of Coal Mining Examiners.

- A. The Board of Coal Mining Examiners **may require certification of persons who work in coal mines** and persons whose duties and responsibilities in relation to coal mining require competency, skill or knowledge in order to perform consistently with the health and safety of persons and property. The following certifications shall be issued by the Board, and a person holding such certification shall be authorized to perform the tasks which this Act or any regulation promulgated by the Board or by the Department requires to be performed by such a certified person:

45.1-161.30.A.

It shall be unlawful for **any person to perform any task requiring certification** by the Board of Coal Mining Examiners until he has been certified. It shall also be unlawful for an operator or his agent to permit any uncertified person to perform such tasks. A violation of this subsection shall constitute a Class 1 misdemeanor. **Each day of operation without a required certification shall constitute a separate offense.**

45.1-161.35. Revocation of certificates

(A) The Board of Coal Mining Examiners may suspend, revoke or take other action regarding any certificate upon finding that the holder has (i) failed to comply with the continuing education requirements within the period following the suspension of the certificate as provided in § 45.1-161.34; (ii) been intoxicated while in duty status; (iii) **neglected his duties;** (iv) **violated any provision of this Act or any other coal mining law of the Commonwealth;** (v) **used any controlled substance without the prescription of a licensed physician;** or (vi) other sufficient cause. The Board shall also suspend, revoke, or take other action regarding the first class mine foreman certificate of any mine foreman who fails to display a thorough understanding of the roof control plan and ventilation for the area of the mine for which he is responsible for implementing, when examined on-site by a mine inspector in accordance with guidelines promulgated by the Board. In such a case, the Board shall make a determination, based on evidence presented by interested parties, of whether the mine foreman had a thorough knowledge of such plans at the time of his examination by the mine inspector.

C. Any person holding a certification issued by the Board shall report to the Chief, within 30 days of any criminal **conviction in any court of competent jurisdiction for possession or use of any controlled substance** without the prescription of a licensed prescriber. This conviction shall result in the immediate temporary suspension of all certificates held by such person pending hearing before the Board.

45.1-161.37.

Every person working in a coal mine in Virginia shall hold a general coal miner certificate issued by the Board of Coal Mining Examiners.

45.1-161.66. Making false statements; penalty.

(B) **Any person who knowingly makes any false statement,** representation or certification in any application, **record, report,** plan or other document filed or required to be maintained under this Act shall, upon conviction, be **guilty of a Class 1 misdemeanor.**

45.1-161.78. Operator's reports of accidents; investigations; reports by Department.

- A. **Each operator will report promptly** to the Department the occurrence at any mine of any accident. **The scene of the accident shall not be disturbed pending an investigation**, except to the extent necessary to rescue or recover a person, prevent or eliminate an imminent danger, prevent destruction of mining equipment, or prevent suspension of use of a slope, entry or facility vital to the operation of a section or a mine. In cases where reasonable doubt exists as to whether to leave the scene unchanged, the operator will secure prior approval from the Department before any changes are made.
- B. The Chief will go personally or dispatch one or more mine inspectors to the scene of such a coal mine accident, investigate causes, and issue such orders as may be needed to ensure safety of other persons.
- C. Representatives of the operator will render such assistance as may be needed and act in a consulting capacity in the investigation. An employee if so designated by the employees of the mine will be notified, and as many as three employees if so designated as representatives of the employees may be present at the investigation in a consulting capacity.

45.1-161.79. Reports of other accidents and injuries.

- A. **Each miner employed at a mine shall promptly notify his supervisor** of any injury received during the course of his employment.
- B. **Each operator shall keep on file a report of each accident** including any accident which does not result in a lost-time injury. Copies of such report shall be given to the person injured or to his designated representative to review the accident report and verify its accuracy prior to filing such report for the review of state or federal mine inspectors.

45.1-161.86. Denial of entry.

No person shall deny the Chief or the Director, as applicable, or any mine inspector entry upon or through a mine for the purpose of conducting an inspection or any office at the site where maps or records relating to the mine are located, pursuant to this Act.

45.1-161.87. Duties of Operator.

- A. The operator, or his agent, of every mine shall furnish the Chief and mine inspectors proper facilities for entering such mine and making examinations or

obtaining information and shall furnish any data or information not of a confidential nature requested by such inspector.

D. The mine **operator shall implement a substance abuse screening policy** and program for all miners that shall, at a minimum, include:

D.1. **A pre-employment, 10-panel urine test** for the following and any other substances as requested by the Board of Coal Mining Examiners:

Amphetamines, Cannabinoids/THC, Cocaine, Opiates, Phencyclidine (PCP), Benzodiazepines, Propoxyphene, Methadone, Barbiturates, and Synthetic narcotics. Samples shall be collected by providers who are certified as complying with standards and procedures set out in the United States Department of Transportation's rule, 49 CFR Part 40. Collected samples shall be tested by laboratories certified by the United States Department of Health and Human Services, Substance Abuse and Mental Health Services Administration (SAMHSA) for collection and testing. The mine operator may implement a more stringent substance abuse screening policy and program.

45.1-161.90. Duties of inspectors

(A) If the Director, the Chief, or a mine inspector has **reasonable cause to believe that a violation of the Act has occurred, he shall with reasonable promptness issue a notice of violation** to the person who is responsible for the violation. Each notice of violation shall be in writing and shall describe with particularity the nature of the violation or violations, including a reference to the provision of this Act or the appropriate regulations violated, and shall include an order of abatement and fix a reasonable time for abatement of the violation.

45.1-161.94. Violations; penalties.

Any person **convicted of willfully violating any provisions of this Act** or any regulation promulgated pursuant to this Act, unless otherwise specified in this Act, shall be **guilty of a Class 1 misdemeanor**

45.1-161.95.

(A) It shall be the duty of every attorney for the Commonwealth to whom the Director or his authorized representative has reported any violation of this Act or on his own initiative to **cause proceedings to be prosecuted** in such cases.

45.1-161.236. Housekeeping; noxious fumes.

A. **Good housekeeping shall be practiced** in and around buildings, shafts, slopes, yards and other areas of mine. Such practices include cleanliness, orderly storage of materials, and the removal of possible sources of injury, such as stumbling hazards, protruding nails, broken glass and possible

falling and rolling materials.

- B. Painting or operations creating noxious fumes shall be performed only in a well-ventilated atmosphere.
- C. All surface mine structures, enclosures, and other **facilities shall be maintained in good repair.**

45.1-161.237. Lighting.

- A. Lights shall be provided as needed in or on surface structures.
- B. **Roads, paths and walks outside of structures shall be kept free from obstructions and shall be well illuminated, if used at night.**

45.1-161.238. Flammable or combustible material.

- A. **Oil, grease, and similar flammable materials shall be kept in closed containers,** separate from other materials so as not to create a fire hazard to nearby buildings or mines. If oil or grease is stored in a building, the building or room in which it is stored shall be of fireproof construction and well ventilated.
- B. Oily rags, oily waste and wastepaper shall be kept in closed metal containers until removed for disposal.
- C. The area within 100 feet of all mine openings shall be kept free of combustible material; however, this shall not apply to the temporary storage of not more than a one day's supply of such materials.
- D. All oxygen and acetylene bottles shall be stored in racks designated and constructed for the storage of such bottles with caps in place and secured when not in use. Any storage place for such materials shall be posted to prohibit smoking.

45.1-161.239. Crane operation.

A crane operator shall at all times during any hazardous crane operation maintain visual or auditory communication with all persons involved in the crane operation.

45.1-161.240. Controlling dust at surface.

- A. In surface structures at excessively dusty mines, electric motors, switches, lighting fixtures, and controls shall be protected by dust-tight construction.
- B. Surface structures and equipment shall be kept free of coal dust accumulations.
- C. **Where mining operations raise an excessive amount of dust into the air, water or water with wetting agent added to it or other effective methods shall be used to allay such dust at its sources.**

45.1-161.241. Scaffolding and overhead protection.

Where repairs are being made to the plant, or where equipment or material is being used or transported overhead, proper scaffolding or proper overhead protection shall be provided.

45.1-161.242. Welding and cutting.

Welding or cutting with arc or flame shall not be done in excessively dusty atmospheres or dusty locations. Fire-fighting apparatus shall be readily available when welding or cutting is performed.

45.1-161.256. Safety examinations.

- A. **On-shift examinations of the work area** including pit, auger, thin seam and highwall operations, shall be conducted by certified persons once every production shift and at such other times or frequency as the Chief designates necessary for dangerous conditions.
- B. **Pre-operational examinations of all mobile equipment shall be conducted by an authorized person.**
- C. Pre-shift examinations shall be conducted by a certified person for certain hazardous conditions designated by the Chief.
- E. **The location of all natural gas pipelines on permitted surface mine areas shall be identified and conspicuously marked so that equipment operators can readily see such lines. Pre-shift examinations shall be conducted of the location of pipelines whenever the work area approaches within 500 feet unless otherwise approved by the Chief.**
- G. Examinations for methane shall be conducted in surface installations, enclosures or other facilities in which coal is handled or stored once each production shift. Such areas shall also be tested for methane before any activity involving welding, cutting or an open flame. Examinations pursuant to this subsection shall be made by an authorized person certified to make gas tests.
- H. Electrical equipment and wiring shall be inspected as often as necessary but at least once a month.
- I. **Fire extinguishers shall be examined at least once every six months.**

45.1-161.257. Records of examinations.

- A. Documentation of examinations and testing conducted pursuant to § 45.1-161.256 **shall be recorded in a mine record book** provided for that purpose. Documentation shall include hazardous conditions found in the work area. However, examinations of fire extinguishers shall be conducted

by an authorized person and documentation shall be accomplished by recording the date of the examination on a permanent tag attached to the extinguisher.

- B. The actual methane readings taken during examinations required under this Act shall be recorded in the mine record book.
- C. **The surface foreman shall maintain and sign a daily record book. Where such reports disclose hazardous conditions, the surface foreman shall take prompt action to have such conditions corrected, barricaded or posted with warning signs.**
- D. **Records shall be countersigned by the supervisor of the examiner creating the records.** Where such records disclose hazardous conditions, the countersigning of the records shall be performed no later than the end of the next regularly scheduled working shift following the shift for which the examination records were completed, and the **person countersigning shall ensure that actions to eliminate or control the hazardous conditions have been taken.** Where such records do not disclose hazardous conditions, the countersigning may be completed within 24 hours following the end of the shift for which the examination records were completed. The operator may authorize another person with equivalent authority of the supervisor to act in the supervisor's temporary absence to read and countersign the records and ensure that action is taken to eliminate the hazardous conditions disclosed in the records.
- E. When one individual serves in more than one position that is required to countersign such reports, he shall only be required to sign each report once.
- F. All records of inspections shall be open for inspection by interested persons and maintained at the mine site for a minimum of one year.

45.1-161.258. Areas with safety or health hazards.

Any hazardous condition shall be corrected promptly or the affected area shall be barricaded or posted with warning signs specifying the hazard and proper safety procedures. **Any imminent danger that cannot be removed within a reasonable time shall be reported to the Chief by the quickest available means.**

45.1-161.259. Personal protection devices and practices.

- A. All persons at a surface coal mine shall wear the following protection in the specified conditions:
 - 1. **Hard hats** in and around mines where falling objects may cause injury.
 - 2. **Hard-toed footwear** in and around mines.

3. Safety goggles or shields where there is a hazard of flying material.
 4. Protective shield or goggles when welding.
 5. **Snug-fitting clothes** when working around moving parts or machinery.
 6. **Gloves where hands could be injured**. Gauntlet cuffed gloves are prohibited around moving machinery.
- B. **Ear protection shall be supplied by the operator** to all miners upon request

45.1-161.260. Housekeeping.

- A. **Good housekeeping shall be practiced** in and around buildings, shafts, slopes, yards and **other areas of the mine**. Such practices include cleanliness, orderly storage of materials, and the removal of possible sources of injury, such as stumbling hazards, protruding nails, broken glass and material that may potentially fall or roll.
- B. All surface mine structures, enclosures, and **other facilities shall be maintained in a safe condition**.

45.1-161.261. Noxious fumes.

Painting or operations creating noxious fumes shall be performed only in a well-ventilated atmosphere.

45.1-161.262. First aid equipment.

Each surface coal mine shall have an adequate supply of first aid equipment as determined by the Chief. Such supplies shall be located at strategic locations at the mine site so as to be available in a reasonable response time. The first aid supplies shall be encased in suitable sanitary receptacles designed to be reasonably dust-tight and moisture proof. In addition to the supplies in the cases, blankets, splints and properly constructed stretchers in good conditions shall be provided. **The supplies shall be available for use of all persons employed at the mine**. No first aid supplies shall be removed or diverted without authorization except in case of injury at the mine.

45.1-161.263. First-aid training.

- A. Surface foremen shall have completed and passed a first aid course of study as prescribed by the Chief. The Chief is authorized to utilize the Department's educational and training facilities in the conduct of such training programs and may require the cooperation of mine operators in making such programs available to their employees.

- B. Each operator of a surface coal mine, upon request, shall make available to every miner employed in such mine first aid training, including refresher training.

45.1-161.264. Attention to injured persons.

- A. **Prompt medical attention shall be provided in the event of an injury** and adequate facilities shall be made available for transporting injured persons to a hospital where necessary.
- B. Safe transportation shall be provided to move injured persons from the site where the injury occurred to areas accessible to emergency transportation.
- C. The operator of each mine shall post directional signs that are conspicuously located to identify the routes of ingress to and egress from any mine located off a public road.

45.1-161.265. Fire-fighting equipment; duties in case of fire; fire precaution in transportation of mining equipment; fire prevention generally.

- A. **Each mine shall be provided with suitable fire-fighting equipment,** adequate for the size of the mine and shall include at least three twenty-pound dry chemical fire extinguishers. Equipment and devices used for the detection, warning and extinguishing of fires shall be suitable in type, size and quantity for the type of fire hazard that may be encountered. Such equipment and devices shall be strategically located and plainly identified.
- B. **Fire extinguishers, suitable from a toxic and shock standpoint, shall be provided** and placed at or on all (i) electrical stations, such as substations, transformer stations and permanent pump stations, (ii) self-propelled mobile equipment, (iii) belt heads, (iv) areas used for the storage of flammable materials, (v) fueling stations, and (vi) other areas that may constitute a fire hazard, so as to be out of the smoke in case of a fire.

45.1-161.266. Duties in case of fire.

- A. Should a fire occur, the person discovering it and any person in the vicinity of the fire shall make a prompt effort to extinguish it. When a fire that may endanger persons at the mine cannot be extinguished immediately, all persons shall be withdrawn promptly from the area of the fire.
- B. **In case of any unplanned fire at or about a mine not extinguished within thirty minutes of discovery, the operator or agent shall report by the quickest available means to the Chief,** giving all information known to him regarding the fire. The Chief shall take prompt action, based on the information, to go in person or dispatch qualified subordinates to the scene of the fire for consultation, and assist in the extinguishing of the fire and the

protection of exposed persons. In the event of a difference of opinion as to measures required, the decision of the Chief or his designated subordinate shall be final, but must be given to the operator in writing to have the force of an order.

45.1-161.267. Fire precautions.

- A. **No person shall smoke or use an open flame within twenty-five feet of locations used to handle or store flammable or combustible liquids** or where an arc or flame may cause a fire or explosion.
- B. Areas surrounding flammable liquid storage tanks, electrical substations and transformers shall be kept free of combustible material for at least twenty-five feet in all directions. Such storage tanks, substations and transformers shall be posted with readily visible fire hazard warning signs.
- C. Structures or areas used for storage of flammable materials shall be constructed of fire resistant material, well ventilated, kept clean and orderly and posted with readily visible fire hazard warning signs.
- D. Fuel lines shall be equipped with shut-off valves at the sources. Such valves shall be readily accessible and maintained in good operating condition.
- E. Battery charging areas shall be well ventilated and posted with warning signs prohibiting smoking or open flames within twenty-five feet.
- F. **Oil, grease, other flammable hydraulic fluid, and other flammable materials shall be kept in closed metal containers** and separated from other materials so as to not create a fire hazard.
- G. **Combustible materials, grease, lubricants, paints and other flammable materials and liquids shall not be allowed to accumulate where they could create a fire hazard.** Provision shall be made to prevent the accumulation of such material on any equipment, at storage areas and any location where the material is used.
- H. Electric motors, switches, lighting fixtures, and controls shall be protected by dust-tight construction.
- I. Precautions shall be taken to ensure that sparks or other hot materials do not result in a fire when welding or cutting. Welding or cutting with arc or flame shall not be done in excessively dusty atmospheres or locations. Fire-fighting apparatus shall be readily available when welding or cutting is performed.
- J. Precautions shall be taken before applying heat, cutting or welding on any pipe or container that has contained a flammable or combustible material.
- K. **Oxygen and acetylene bottles shall be stored in racks** designated and constructed for the storage of such bottles with caps in place and secured when not in use. Such bottles shall not be stored near oil, grease, and other

flammable material.

- L. Oxygen and acetylene gauges and regulators shall be kept clean and free of oil, grease, and other combustible materials.
- P. Internal combustion engines, except diesel engines, shall be shut off prior to fueling.

45.1-161.268. Haulage and mobile equipment; operating condition.

- A. **All mobile equipment shall be maintained in a safe operating condition.**
- B. **Positive-acting stopblocks shall be used where necessary to protect persons from danger of moving or runaway haulage equipment.**
- C. Where it is necessary for men to cross conveyors regularly, suitable crossing facilities shall be provided.
- D. **Persons shall not get on or off moving equipment.**
- E. When the equipment operator is present, persons shall notify him before getting on or off mobile equipment.
- F. **Mobile equipment shall not be left unattended unless brakes are set. Mobile equipment with wheels or tracks, when parked on a grade, shall either be blocked or turned into a bank unless the lowering of the bucket or blade to the ground will prevent movement.**
- G. **Persons shall not work on or from a piece of mobile equipment in a raised position unless the equipment is specifically designed to lift persons.**
- H. Water, debris or spilled materials which may create hazards to moving equipment shall be removed.
- I. **Where seating facilities are provided on self-propelled mobile equipment, the operator shall be seated before such equipment is moved. No person shall be allowed to ride on top of self-propelled mobile equipment.**
- J. **Operators of self-propelled haulage equipment shall sound a warning before starting such equipment and as approaching any place where persons are or are likely to be.**

45.1-161.269. Equipment operation.

- D. **Before starting or moving equipment, an equipment operator must be certain by signal or other means that all persons are clear.**

45.1-161.270. Safety measures on equipment.

- A. **Seat belts provided in mobile equipment shall be maintained in safe working condition. Operators of such equipment shall wear seat belts when the equipment is in motion.**

- B. Mobile equipment shall be equipped with **adequate brakes** and parking brakes.
- C. Cab windows shall be of safety design, kept in good condition and clean for adequate visibility.
- D. Tires shall be deflated before repairs on them are started and adequate means shall be provided to prevent wheel locking rims from creating a hazard during tire inflation.
- E. **An audible warning device and headlights** shall be provided on all self-propelled mobile equipment.
- F. An **automatic backup alarm**, which is audible above surrounding noise levels, shall be provided on all mobile equipment. An automatic, reverse activated strobe light may be substituted for an audible alarm when mobile equipment is operated at night.
- G. All equipment raised for repairs or other work shall be **securely blocked** prior to persons positioning themselves where the falling of such equipment could create a hazardous condition.

45.1-161.271. Transportation of personnel.

No person shall be permitted to ride or be otherwise transported on or in: (i) dippers, shovels, buckets, forks and clamshells, (ii) the cargo space of dump trucks, (iii) outside cabs or beds of heavy equipment, or (iv) chain, belt or bucket conveyors unless specifically designed to transport persons.

45.1-161.272. Lighting.

- A. Lights shall be provided as needed, in or on surface structures.
- B. **Roads, paths and walks outside of surface structures shall be kept free from obstructions and shall be well illuminated if used at night.**

45.1-161.273. Shop and other equipment.

- A. The following **shall be guarded** and maintained adequately:
 1. Gears, sprockets, pulleys, fan blades or propellers, friction devices and couplings with protruding bolts or nuts.
 2. Shafting and projecting shaft ends that are within seven feet of floor or platform.
 3. Belt, chain or rope drives that are within seven feet of floor or platform.
 4. Fly wheels. Where fly wheels extend more than seven feet above the floor, they shall be guarded to a height of at least seven feet.
 5. Circular and band saws and planers.

6. Repair pits. Guards shall be kept in place when the pits are not in use.
 7. Counterweights.
 8. Mine fans. The approach shall be guarded.
 9. Lighting and other electrical equipment that may cause shock hazards or personal injury.
- B. Machinery shall not be repaired or oiled while in motion; provided, however, that this shall not apply where safe remote oiling devices are used.
- C. **A guard or safety device removed from any machine shall be replaced before the machine is put in operation.**
- D. Mechanically operated grinding wheels shall be equipped with:
1. Safety washers and tool rests.
 2. Substantial retaining hoods, the hood opening of which shall not expose more than a ninety-degree sector of the wheel. Such hoods shall include a device to control and collect excess rock, metal or dust particles, or equivalent protection shall be provided to the employees operating such machinery.
 3. Eye shields, unless goggles are worn by the operators.
- E. The operator or his agent shall develop procedures for examining for potential hazards, completing proper maintenance, and properly operating each type of centrifugal pump. The procedures shall, at a minimum, address the manufacturers' recommendations for start-up and shutdown of the pumps, proper actions to be taken when a pump is suspected of overheating, safe location of start and stop switches, and actions to be taken when signs of structural metal fatigue such as cracks in the frame, damaged cover mounting brackets, or missing bolts or other components are detected. All miners who repair, maintain, or operate such pumps shall be trained in these procedures.

45.1-161.274. Hydraulic hoses.

All hydraulic hoses used on equipment purchased after January 1, 1986, shall be clearly stamped or labeled by the hydraulic hose manufacturer to indicate the manufacturer's rated pressure in pounds per square inch (psi). For hoses purchased after January 1, 1989, the rated pressure shall be permanently affixed on the outer surface of the hose and repeated at least every two feet. Hoses purchased and installed on automatic displacement hydraulic systems shall have a four-to-one safety factor based on the ratio between minimum burst pressure and the setting of the hydraulic unloading system (such as a relief valve) or shall meet the minimum hose pressure requirements set by the hydraulic equipment manufacturer per the applicable hose standards for each type of equipment. No hydraulic hose shall be used

in an application where the hydraulic unloading system is set higher than the hose's rated pressure.

45.1-161.275. Stairways, platforms, runways and floor opening.

- A. Stairways, platforms, and runways shall be provided where men work or travel.
- B. Stairways, elevated platforms, floor openings and elevated runways shall be equipped with suitable handrails or guardrails.
- C. Elevated platforms, floor openings, stairways and runways shall be provided with toe boards. Platforms, stairways and runways shall be kept clear of stumbling and slipping hazards and maintained in good repair.

45.1-161.277. Equipment operation.

- B. **Dippers, buckets, scraper blades and similar movable parts shall be secured or lowered to the ground when not in use.**
- C. Equipment which is to be hauled shall be loaded and protected so as to prevent sliding or spillage. **When moving between work areas the equipment shall be secured in the travel position.**
- D. **Tow bars shall be used to tow heavy equipment and a safety chain shall be used in conjunction with each tow bar.**
- E. **Dust control measures shall be taken so as to not obstruct visibility of equipment operators.**
- F. Dippers, buckets, loading booms or other heavy loads shall not be swung over cabs of haulage equipment until the driver is out of the cab and is in a safe location unless the equipment is designed specifically to protect drivers from falling material.
- G. Lights, flares or other warning devices shall be posted when parked equipment creates a hazard for other vehicles.

45.1-161.278. Control of dust and combustible material.

- C. Loose coal, coal dust, oil, grease, and other combustible materials shall not be permitted to accumulate excessively on equipment or surface structures.

45.1-161.279. Overhead high-potential power lines; surface transmission lines; electric wiring in surface buildings.

- A. Overhead high-potential power lines shall be placed at least fifteen feet above the ground and twenty feet above driveways and haulage-ways, shall be installed on insulators, and shall be supported and guarded to prevent contact with other circuits.
- B. Surface transmission lines shall be protected against short circuits and

lightning.

- C. Electric wiring in surface buildings shall be installed so as to prevent fire and contact hazards.

45.1-161.280. Transformers

- A. Unless surface transformers are isolated by elevation (eight feet or more above the ground), they shall be enclosed in a transformer house or surrounded by a suitable fence at least six feet high. If the enclosure or fence is of metal, it shall be grounded effectively. The gate or door to the enclosure shall be kept locked at all times, unless authorized by persons are present.
- B. Surface transformers containing flammable oil and installed where they present a fire hazard shall be provided with means to drain or to confine the oil in the event of rupture of the transformer casing.
- C. Suitable danger signs shall be posted conspicuously at all transformer stations on the surface.
- D. All transformer stations on the surface shall be kept free of nonessential combustible materials and refuse.
- E. No electrical work shall be performed on low-voltage, medium-voltage, or high-voltage distribution circuits or equipment, except by a certified person or by a person trained to perform electrical work and to maintain electrical equipment under the direct supervision of a certified person. All high-voltage circuits shall be grounded before repair work is performed. Disconnecting devices shall be locked out and suitably tagged by the persons who perform electrical or mechanical work on such circuits or equipment connected to the circuits, except that in cases where locking out is not possible, such devices shall be opened and suitably tagged by such persons. Locks and tags shall be removed only by the persons who installed them or, if such persons are unavailable, by certified persons authorized by the operator or his agent. However, employees may, where necessary, repair energized trolley wires if they wear insulated shoes and lineman's gloves. This section does not prohibit certified electrical repairmen from making checks on or troubleshooting energized circuits or the performance of repairs or maintenance on equipment by authorized persons once the power is off and the equipment is blocked against motion, except where motion is necessary to make adjustments.

45.1-161.281. Grounding.

- A. All metallic sheaths, armors, and conduits enclosing power conductors shall be electrically continuous throughout and shall be grounded effectively.

- B. Metallic frames, casing, and other enclosures of stationary electric equipment that can become “alive” through failure of insulation or by contact with energized parts shall be grounded effectively or equivalent protection shall be provided.
- C. When electric equipment is operated from three-phase alternating current circuits originating in transformers connected to provide a neutral point, a continuous grounding conductor of adequate size shall be installed and connect to the neutral point and to the frames of the power-utilizing equipment. Such grounding conductors shall be grounded at the neutral point and at intervals along the conductor if feasible. A suitable circuit breaker or switching device shall be provided having a ground-trip coil connected series with the grounding conductor to provide effective ground-fault tripping.

45.1-161.282. Circuit breakers and switches.

- A. Automatic circuit breaking devices or fuses of the correct type and capacity shall be installed so as to protect all electric equipment and power circuits against excessive overload. Wires or other conducting materials shall not be used as a substitute for properly designed fuses, and circuit-breaking devices shall be maintained in good operating condition.
- B. Operating controls, such as switches, starters and switch buttons, shall be so installed that they are readily accessible and can be operated without danger of contact with moving or live parts.
- C. Electric equipment and circuits shall be provided with switches or other controls of safe design, construction and installation.
- D. Insulating mats, or other electrically nonconductive materials shall be kept in place at each switchboard, power-control switch, and at stationary machinery where shock hazards exist.
- E. Suitable danger signs shall be posted conspicuously at all high- voltage installations.
- F. All power wires and cables shall have adequate current-carrying capacity, shall be guarded from mechanical injury and installed in a permanent manner.
- G. Power circuits shall be labeled to indicate the unit or circuit they control.
- H. Persons shall stay clear of an electrically powered shovel or other similar heavy equipment during an electrical storm.
- I. All devices installed on or after July 1, 2005, which provide either short circuit protection or protection against overload, shall conform to the minimum requirements for protection of electric circuits and equipment of the National Electric Code in effect at the time of their installation.

- J. All electric conductors installed on or after July 1, 2005, shall be sufficient in size to meet the minimum current-carrying capacity provided for in the National Electric Code in effect at the time of their installation.
- K. All trailing cables purchased on or after July 1, 2005, shall meet the minimum requirements for ampacity provided in the standards of the Insulated Power Cable Engineers Association - National Electric Manufacturers Association in effect at the time such cables are purchased.

45.1-161.283. Electrical trailing cables.

- A. Trailing cables shall be provided with suitable short-circuit protection and means of disconnecting power from the cable.
- B. Temporary splices in trailing cables shall be made in a workmanlike manner, mechanically strong, and well insulated.
- C. The number of temporary, unvulcanized splices in a trailing cable shall be limited to one.
- D. Permanent splices in trailing cables shall be made as follows:
 - 1. Mechanically strong with adequate electrical conductivity and flexibility.
 - 2. Effectively insulated and sealed so as to exclude moisture.
 - 3. The finished splice shall be vulcanized or otherwise treated with suitable materials to provide flame-resistant properties and good bonding to the outer jacket.
- E. Trailing cables shall be protected against mechanical injury.

Section 2 Code of Federal Regulations, Title 30, Part 77

Subpart B--Qualified and Certified Person

77.100 Certified persons.

(a)(1) The provisions of this Part 77 require that certain examinations and tests be made by a certified person. A certified person within the meaning of these provisions is a person who has been certified in accordance with the provisions of paragraph (b) of this §77.100 to perform the duties, and make the examinations and tests which are required by this Part 77 to be performed by a certified person.

(2) A person who has been so certified shall also be considered to be a qualified person within the meaning of those provisions of this Part 77 which require that certain examinations, tests and duties be performed by a qualified person, except those provisions in Subparts F, G, H, I, and J of this part relating to performance of electrical work.

(b) Pending issuance of Federal standards, a person will be considered, to the extent of the certification, a certified person to make examinations, tests and perform duties which are required by this Part 77 to be performed by a certified person:

(1) **If he has been certified for such purpose by the State in which the coal mine is located;** or

77.101 Tests for methane and for oxygen deficiency; qualified person.

(a) The provisions of Subparts C, P, R, and T of this Part 77 require that tests for methane and for oxygen deficiency be made by a qualified person. A person is a qualified person for these purposes if he is a certified person for such purposes under §77.100.

(b) Pending issuance of Federal standards, a person will be considered a qualified person for testing for methane and oxygen deficiency:

(1) **If he has been qualified for this purpose by the State in which the coal mine is located;** or

77.102 Electrical work; qualified person.

(a) Except as provided in paragraph (f) of this section, an individual is a qualified person within the meaning of Subparts F, G, H, I, and J of this Part 77 to perform electrical work (other than work on energized surface high-voltage lines) if:

(1) **He has been qualified as a coal mine electrician by a State that has a coal mine electrical qualification program approved by the Secretary;**

or,

(2) He has at least 1 year of experience in performing electrical work underground in a coal mine, in the surface work areas of an underground coal mine, in a surface coal mine, in a noncoal mine, in the mine equipment manufacturing industry, or in any other industry using or manufacturing similar equipment, and has satisfactorily completed a coal mine electrical training program approved by the Secretary.

77.105 Qualified hoistman slope or shaft sinking operation; qualifications.

(a)(1) A person is a qualified hoistman within the provisions of Subpart T of this part, for the purpose of operating a hoist at a slope or shaft sinking operation if he has at least 1 year experience operating a hoist plant or maintaining hoist equipment and is qualified by any State as a hoistman or its equivalency, or

(2) If a State has no program for qualifying persons as hoistmen, the Secretary may qualify persons if the operator of the slope or shaft-sinking operation makes an application and a satisfactory showing that the person has had 1 year of experience operating hoists. A person's qualification is valid for as long as the person continues to satisfy the requirements for qualification and is employed at the same coal mine or by the same independent contractor.

77.106 Records of certified and qualified persons.

The operator of each coal mine shall maintain a list of all certified and qualified persons designated to perform duties under this Part 77.

77.107 Training Programs.

Each operator must submit to the district manager, of the Coal Mine Safety and Health District in which the mine is located, a program or plan setting forth what, when, how, and where the operator will train and retrain persons whose work assignments require that they be certified or qualified. The program must provide:

(a) For certified persons, annual training courses in the tasks and duties which they perform as certified persons, first aid, and the provisions of this Part 77; and

(b) For qualified persons, annual courses in performance of the tasks which they perform as qualified persons.

Subpart C--Surface Installations

77.200 Surface installations; general.

All mine structures, enclosures, or other facilities (including custom coal preparation) shall be **maintained in good repair** to prevent accidents and injuries to employees.

77.201 Methane content in surface installations

The methane content in the air of any structure, enclosure or other facility shall be **less than 1.0 volume per centum**.

77.201-2 Methane accumulations; change in ventilation.

If, at any time, the air in any structure, enclosure or other facility contains 1.0 volume per centum or more of methane changes or adjustments in the ventilation of such installation shall be made at once so that the air shall contain less than 1.0 volume per centum of methane.

77.202 Dust accumulations in surface installations.

Coal dust in the air of, or in, or on the surfaces of, structures, enclosures, or other facilities shall not be allowed to exist or accumulate in dangerous amounts.

77.203 Use of material or equipment overhead; safeguards.

Where overhead repairs are being made at surface installations and equipment or material is taken into such overhead work areas, adequate protection shall be provided for all persons working or passing below the overhead work areas in which such equipment or material is being used.

77.204 Openings in surface installations; safeguards.

Openings in surface installations through which men or material may fall shall be protected by railings, barriers, covers or other protective devices.

77.205 Travelways at surface installations.

(a) Safe means of access shall be provided and maintained to all working places.

(b) Travelways and platforms or other means of access to areas where persons are required to travel or work, shall be kept clear of all extraneous material and other stumbling or slipping hazards.

- (c) Inclined travelways shall be constructed of nonskid material or equipped with cleats.
- (d) Regularly used travelways shall be sanded, salted, or cleared of snow and ice as soon as practicable.
- (e) Crossovers, elevated walkways, elevated ramps, and stairways shall be of substantial construction, provided with handrails, and maintained in good condition. Where necessary toeboards shall be provided.
- (f) Crossovers shall be provided where it is necessary to cross conveyors.
- (g) Moving conveyors shall be crossed only at designated crossover points

77.206 Ladders; construction; installation and maintenance.

- (a) Ladders shall be of substantial construction and maintained in good condition.
- (b) Wooden members of ladders shall not be painted.
- (c) Steep or vertical ladders which are used regularly at fixed locations shall be anchored securely and provided with backguards extending from a point not more than 7 feet from the bottom of the ladder to the top of the ladder.
- (d) Fixed ladders shall not incline backwards at any point unless provided with backguards.
- (e) Fixed ladders shall be anchored securely and installed to provide at least 3 inches of toe clearance.
- (f) Fixed ladders shall project at least 3 feet above landings, or substantial handholds shall be provided above the landings.

77.207 Illumination.

Illumination sufficient to provide safe working conditions shall be provided in and on all surface structures, paths, walkways, stairways, switch panels, loading and dumping sites, and working areas.

77.208 Storage of materials.

- (a) Materials shall be stored and stacked in a manner which minimizes stumbling or fall-of-material hazards.
- (b) Materials that can create hazards if accidentally liberated from their containers shall be stored in a manner that minimizes the dangers.
- (c) Containers holding hazardous materials must be of a type approved for such use by recognized agencies.
- (d) Compressed and liquid gas cylinders shall be secured in a safe manner.
- (e) Valves on compressed gas cylinders shall be protected by covers when being transported or stored, and by a safe location when the cylinders are in use.

77.210 Hoisting of materials.

- (a) Hitches and slings used to hoist materials shall be suitable for handling the type of materials being hoisted.
- (b) Men shall stay clear of hoisted loads.
- (c) Taglines shall be attached to hoisted materials that require steadying or guidance.

Subpart L – Fire Protection

77.1100 Fire protection; training and organization.

Firefighting facilities and equipment shall be provided commensurate with the potential fire hazards at each structure, enclosure and other facility (including custom coal preparation) at the mine and the employees at such facilities shall be instructed and trained annually in the use of such firefighting facilities and equipment.

77.1101 Escape and evacuation; plan.

- (a) Before September 30, 1971, each operator of a mine shall establish and keep current a specific escape and evacuation plan to be followed in the event of a fire.
- (b) All employees shall be instructed on current escape and evacuation plans, fire alarm signals, and applicable procedures to be followed in case of fire.
- (c) Plans for escape and evacuation shall include the designation and proper maintenance of adequate means for exit from all areas where persons are required to work or travel including buildings and equipment and in areas where persons normally congregate during the work shift.

77.1102 Warning signs; smoking and open flame.

Signs warning against smoking and open flames shall be posted so they can be readily seen in areas or places where fire or explosion hazards exist.

77.1103 Flammable liquids; storage.

Flammable liquids shall be stored in accordance with standards of the National Fire Protection Association. Small quantities of flammable liquids drawn from storage shall be **kept in properly identified safety cans.**

77.1104 Accumulations of combustible materials.

Combustible materials, grease, lubricants, paints, or flammable liquids **shall not be allowed** to accumulate where they can **create a fire hazard**.

77.1106 Battery-charging stations; ventilation.

Battery-charging stations shall be located in well-ventilated areas. Battery-charging stations shall be equipped with reverse current protection where such stations are connected directly to direct current power systems.

77.1109 Quantity and location of firefighting equipment.

Preparation plants, dryer plants, tipples, drawoff tunnels, shops, and other surface installations shall be equipped with the following firefighting equipment.

(a) Each structure presenting a fire hazard shall be provided with portable fire extinguishers commensurate with the potential fire hazard at the structure in accordance with the recommendations of the National Fire Protection Association.

(c)(1) **Mobile equipment, including trucks, front-end loaders, bulldozers, portable welding units, and augers, shall be equipped with at least one portable fire extinguisher.**

(2) Power shovels, draglines, and other large equipment shall be equipped with at least one portable fire extinguisher; however, additional fire extinguishers may be required by an authorized representative of the Secretary.

(3) Auxiliary equipment such as portable drills, sweepers, and scrapers, when operated more than 600 feet from equipment required to have portable fire extinguishers, shall be equipped with at least one fire extinguisher.

(c) Fire extinguishers shall be provided at permanent electrical installations commensurate with the potential fire hazard at such installation in accordance with the recommendations of the National Fire Protection Association.

(e) Two portable fire extinguishers, or the equivalent, shall be provided at each of the following combustible liquid storage installations:

(1) Near each above ground or unburied combustible liquid storage station; and,

(2) Near the transfer pump of each buried combustible liquid storage tank.

(f) Vehicles transporting explosives and blasting agents shall be equipped with fire protection as recommended in Code 495, section 20, National Fire Protection Association Handbook, 12th Edition, 1962.

77.1110 Examination and maintenance of firefighting equipment.

Firefighting equipment shall be continuously maintained in a usable and operative condition. Fire extinguishers shall be examined at least once every 6 months and the date of such examination shall be recorded on a permanent tag attached to the extinguisher.

77.1111 Welding, cutting, soldering; use of fire extinguisher.

One portable fire extinguisher shall be provided at each location where welding, cutting, or soldering with arc or flame is performed.

77.1112 Welding, cutting, or soldering with arc or flame; safeguards.

(a) When welding, cutting, or soldering with arc or flame near combustible materials, suitable precautions shall be taken to insure that smoldering metal or sparks do not result in a fire.

(b) Before welding, cutting, or soldering is performed in areas likely to contain methane, an examination for methane shall be made by a qualified person with a device approved by the Secretary for detecting methane. Examinations for methane shall be made immediately before and periodically during welding, cutting, or soldering and such work shall not be permitted to commence or continue in air which contains 1.0 volume per centum or more of methane.

Subpart R - Miscellaneous

77.1702 Arrangements for emergency medical assistance and transportation for injured persons; reporting requirements; posting requirements.

(a) Each operator of a surface coal mine shall make arrangements with a licensed physician, medical service, medical clinic, or hospital to provide **24-hour emergency medical assistance** for any person injured at the mine.

(b) Each operator shall make arrangements with an **ambulance service**, or otherwise provide for 24-hour emergency transportation for any person injured at the mine.

(c) Each operator shall, on or before September 30, 1971, report to the Coal Mine Health and Safety District Manager for the district in which the mine is located the name, title and address of the physician, medical service, medical clinic, hospital, or ambulance service with whom arrangements have been made, or otherwise provided, in accordance with the provisions of paragraphs (a) and (b) of this section.

(d) Each operator shall, within 10 days after any change of the arrangements required to be reported under the provisions of this section, report such changes to the Coal Mine Health and Safety District Manager. If such

changes involve a substitution of persons, the operator shall provide the name, title, and address of the person substituted together with the name and address of the medical service, medical clinic, hospital, or ambulance service with which such person or persons are associated.

(e) Each operator shall, immediately after making an arrangement required under the provisions of paragraphs (a) and (b) of this section, or immediately after any change, of such agreement, post at appropriate places at the mine the names, titles, addresses, and telephone numbers of all persons or services currently available under such arrangements to provide medical assistance and transportation at the mine.

77.1713 (a), (b), (c), (d) Daily inspection of surface coal mine; certified person; reports of inspection.

(a) At least once during each working shift, or more often if necessary for safety, each active working area and each active surface installation shall be examined by a certified person designated by the operator to conduct such examinations for hazardous conditions and any hazardous conditions noted during such examinations shall be reported to the operator and shall be corrected by the operator.

(b) If any hazardous condition noted during an examination conducted in accordance with paragraph (a) of this section creates an imminent danger, the person conducting such examination shall notify the operator and the operator shall withdraw all persons from the area affected, except those persons referred to in section 104(d) of the Act, until the danger is abated.

(c) After each examination conducted in accordance with the provisions of paragraph (a) of this section, each certified person who conducted all or any part of the examination required shall enter with ink or indelible pencil in a book approved by the Secretary the date and a report of the condition of the mine or any area of the mine which he has inspected together with a report of the nature and location of any hazardous condition found to be present at the mine. The book in which such entries are made shall be kept in an area at the mine designated by the operator to minimize the danger of destruction by fire or other hazard.

(d) All examination reports recorded in accordance with the provisions of paragraph (c) of this section shall include a report of the action taken to abate hazardous conditions and shall be signed or countersigned each day by at least one of the following persons:

- (1) The surface mine foreman;
- (2) The assistant superintendent of the mine;

- (3) The superintendent of the mine; or,
- (4) The person designated by the operator as responsible for health and safety at the mine.

Section 3 Surface Installation Checklist

1. **Examine record books of daily inspections** to determine whether inspections and hazardous conditions found are noted by certified persons.
2. **Check for qualified and certified persons** to determine whether such persons are available.
3. **Check training plans and records** to determine whether persons are being trained.
4. **Check for emergency medical arrangements** to determine whether arrangements are made.
5. Conduct a general overview inspection of surface facilities to discover **any hazardous conditions and or violations.**
6. Check all mine structures to determine whether they are **maintained in good repair.**
7. Check on communications in the work area to determine whether **communications are maintained** to workers where hazardous conditions exist.
8. Check gratings and railings to determine whether they are **structurally sound** and clear of slipping and stumbling hazards.
9. Check accesses to work areas to determine whether they are safe.
10. Check structural changes to determine whether changes have created any new hazards.
11. Check employee work habits to determine whether workers **follow safe procedures.**
12. Check openings through which miners or materials may fall to determine whether they are properly guarded.
13. Check fixed ladders to determine whether they are anchored, in good repair, and back-guarded where required.

14. Check portable ladders to determine whether they are sound and anchored during use.
15. Test for methane to determine whether dangerous methane accumulations exist.
- 16. Check lighting to determine whether it is adequate.**
17. Check Travelways, crossovers, and walkways to determine whether they are constructed and maintained for safety.
18. Check for dust accumulations to determine whether dangerous accumulations exist.
19. Check hoisting of materials to determine if hoisting is being done safely.
20. Check use of material overhead to detect hazardous conditions.
21. Check access doors to determine if doors are functional.
22. **Examine fire extinguishers** and fire fighting equipment.

Section 4 Basic Characteristics of Fire and Firefighting

Complete Triangle

Fire burns because three elements are present; **heat, fuel and oxygen**. In technical language, fire is a chemical reaction. It happens when a material unites with oxygen so rapidly that it produces flame. Think of fire as a triangle. If any one of the three sides; heat, fuel or oxygen is removed, the fire goes out. When a fire is extinguished, the **heat is removed by cooling**, the **oxygen is removed by excluding air, the fuel is removed to a place where there is no flame**, and the chemical reaction is stopped by inhibiting the oxidation of the fuel.

Cooling a fire requires applying an agent or agents, which absorbs heat. Water is the most common cooling agent and usually is applied in the form of a solid stream, finely divided spray, or incorporated in foam.

Flammable liquid storage tanks can be arranged so their contents can be pumped to an isolated empty tank in case of fire. When flammable gases catch fire as they are flowing from a pipe, the fire will go out if the valve is shut off.

Oxygen can frequently be removed or reduced from a fire by a wet blanket, throwing dirt on the fire, or covering the burning area with chemicals or mechanical foam. Other gases, which are heavier than air, such as carbon dioxide and vaporizing liquid, can be used to blanket the fire, preventing the oxygen from getting to the fire.

Recent studies have indicated that the familiar statement, “Removal of heat, fuel or oxygen, will extinguish a fire,” does not apply when dry chemical or halogenated hydrocarbons are used as the extinguishing agents. These agents inactivate intermediate product of the flame reaction resulting in a reduction of the combustion rate (the rate of heat evolution) and extinguishes the fire.

We have always looked at fire from the perspective of a triangle; however, there is a fourth factor. During a fire, the complex molecules are broken down into simpler compounds and other substances. As the temperature, increases and additional oxygen draws into the flame, new compounds and substances recombine and further break down. As these recombined molecules and substances reach their ignition point, they begin to burn, causing an increase in the temperature, drawing in additional oxygen, and forming new compounds and substances. This process continues until these substances reach a lower temperature. Therefore, as long as

there is adequate fuel and oxygen, and the temperature is sustained, the chain reaction continues the combustion process.

Classification of Fires

Class “A” fires occur in ordinary combustible materials which retain heat such as wood, cloth, paper, rubber, plastic, textiles, etc.

The most commonly used extinguishing agent is water, which cools and quenches. Fires of these materials are also extinguished by special dry chemicals for use on Class A, B and C fires. These provide a rapid knock down of flame and form a fire retardant coating, which prevents reflash.

Class “B” fires occur in the vapor-air-mixture over the surface of flammable liquids such as greases, paint, gasoline and lubricating oils. A smothering or combustion inhibiting effect is necessary to extinguish Class “B” fires. Halon, dry chemical, foam, vaporizing liquids, carbon dioxide and water fog all can be used as extinguishing agents depending on the circumstances of the fire.

Characteristics of Flammable Liquids

A layer of vapors always covers flammable liquids. When mixed with air and contacted by an ignition source, it is the vapor, not the liquid, which burns. The fuel vapor and oxygen provide two sides of the fire triangle. A flammable liquid is usually more dangerous when temperatures are high because more vapors are generated. Four terms commonly used with flammable liquids are:

- Flash Point – The lowest temperature at which a liquid gives off enough vapors to form a flammable mixture with air. Flash point of diesel is 100 to 120 degrees F. and gasoline is minus 50 degrees F.
- Fire Point – The lowest temperature at which the vapor-air-mixture will continue to burn after it is ignited. This is generally a few degrees above the flash point.
- Ignition Temperature – The temperature at which a mixture of flammable vapor and air will ignite without a spark or flame (spontaneous combustion). This term also applies to the temperature of a hot surface, which will ignite flammable vapors. The temperature varies with the type of surface.

- Flammable or Explosive Range – The range between the smallest and largest amounts of vapor in a given quantity of air which will explode or burn when ignited (usually expressed in percentages.) For instance, carbon disulfide has an explosive range of one to 50 percent. If air contains more than one or less than 50 parts of carbon disulfide vapor, the mixture can explode or burn.
- Gasoline as a Fire Hazard – The most commonly known flammable liquid is gasoline. It has a flash point of about minus 50 degrees F., a comparatively low figure. Burning gasoline has a temperature above 1500 degrees F.; therefore, it can heat objects in the fire area above its ignition temperature. To prevent re-ignition after extinguishment, the agent should be applied for a sufficient time to allow hot objects in the fire area to cool below the ignition temperature of the gasoline. It is dangerous to use water in a solid stream on a gasoline fire because it may spatter the fuel or raise its level in a container so it overflows.

The flammable range of gasoline is only 1.3 percent to 6 percent. Gasoline vapors are heavier than air. They tend to flow downhill and downwind from liquid gasoline, making it possible for explosive mixtures to collect in low points such as pipe trenches or terrain depressions. If the amount of oxygen in a given atmosphere is reduced from its normal, 21 percent to 14 percent by diluting with carbon dioxide, most petroleum products cannot burn. As a result, a gasoline fire can be “suffocated” by diluting the atmosphere with an inert gas.

Class “C” fires occur in electrical equipment where non-conducting extinguishing agents must be used. Dry chemical, carbon dioxide, and vaporizing liquids are suitable. Because foam, water (except as a spray), and water-type extinguishing agents conduct electricity, their use can kill or injure the person operating the extinguisher, and damage electrical equipment. (Halon must not be used underground.)

Class “D” fires occur in combustible metals such as magnesium, titanium, zirconium, sodium, and potassium. Some metals can produce their own oxygen. Specialized techniques, extinguishing agents and extinguishing equipment have been developed to control and extinguish fires of this type. Normal extinguishing agents must not be used on metal fires, as there is danger in most cases of increasing the intensity of the fire because of a chemical reaction between the burning metal and some extinguishing agents.

Section 5 Sample Questions

1. Q. How often should surface electric equipment and wiring be inspected by a certified person to assure safe operating condition?
A. Monthly
2. Q. What shall be maintained on all surface mine power circuits?
A. Power circuits shall be labeled to indicate the unit or circuit they control.
3. Q. Who is allowed to perform electrical work at surface installations?
A. A certified electrical repairman who is certified for the surface or underground.
4. Q. What kind of sign shall be posted at all transformer stations?
A. Suitable danger signs.
5. Q. Before working on a power circuit or electric equipment, who must de-energize, lock out and tag the circuit?
A. Persons exposed to the risk should the circuit or equipment be energized.
6. Q. Who is allowed to operate machinery and equipment?
A. An authorized person who is task trained.
7. Q. Persons shall not work on or from a piece of mobile equipment in a raised position unless:
A. The equipment is specifically designed to lift persons.
8. Q. After making repairs to machinery:
A. All guards and shields should be replaced before machinery is put into operation.
9. Q. Adequate guards shall be maintained on:
A. Gears, sprockets, and pulleys; shafting and projecting shaft ends that are within seven feet of the floor; and circular and band saws.
10. Q. What is the duty of the surface facilities foreman relative to new employees hired to work at a shop?

A. **To instruct each new employee of the dangers incident to his job task.**

11.Q. What is required to be completed and submitted by applicants for the surface facilities foreman?

A. **BOE-1A and BOE-2A, relating to application and work experience, and first aid certificate, first responder or 5000-23 certificate.**

12.Q. What work experience is required prior to being certified as a surface facilities foreman?

A. **Applicant shall possess one-year work experience at a shop, lab or warehouse or appropriately related work experience approved by the Division of Mines.**

13.Q. The surface facilities foreman certification can be used in lieu of:

A. **No certifications. The surface facilities foreman certification is for shops, labs, warehouses or clear cutting.**

14.Q. What kind of fire fighting equipment must be on all mobile equipment?

A. **At least one portable fire extinguisher.**

15.Q. How often shall fire-fighting equipment be examined?

A. **At least once every 6 months.**

16.Q. What shall be reported immediately to the Chief or designated representative?

A. **Any imminent danger condition, which cannot be removed within a reasonable time, accidents involving serious personal injury or death, serious fires or unplanned explosions.**

17.Q. Combustible materials, such as grease, paints or other flammable liquids, shall not be allowed to:

A. **Accumulate where they will create a fire hazard.**

18.Q. Where are employees prohibited from smoking or using an open flame?

A. **Within 25 feet of where flammable liquids are stored or handled.**

19.Q. Oxygen and acetylene bottles shall be:

A. **Stored in racks designated and constructed for the storage of such bottles.**

- 20.Q. What should be a good practice in and around all work areas?
A. **Good housekeeping.**
- 21.Q. Steps, landings, platforms and walkways should be kept free of:
A. **Oil, grease and ice.**
- 22.Q. What precautions shall be taken when painting in shops or warehouses?
A. **Painting shall be performed in a well-ventilated atmosphere.**
- 23.Q. When and where shall lights be provided for surface structures and areas outside surface structures?
A. **Lights shall be provided as needed and for roads, paths and walks if used at night.**
- 24.Q. What eye protection shall be provided at stationary grinding wheels?
A. **Eye shields or goggles.**
- 25.Q. Where should eye protection be worn?
A. **Where hazards exist from flying materials.**
- 26.Q. Where shall hard-toe footwear be worn?
A. **Hard-toe footwear shall be worn in and around mines.**
- 27.Q. Where shall hard hats be worn?
A. **Hard hats are required in and around mines, where falling objects may cause injury.**
- 28.Q. Automatic circuit breakers devices and fuses shall be installed so as to protect equipment and power circuits from:
A. **Excessive overload**
- 29.Q. Before work is conducted on electrical or mechanical equipment, disconnecting devices shall be:
A. **Locked and tagged out**
- 30.Q. When not in use, dippers, buckets, scraper blades and similar moveable parts shall be:
A. **Secured or lowered to the ground**

- 31.Q. What type of hitches and slings shall be used to hoist materials?
A. **Suitable for the type of material being hoisted.**
- 32.Q. What shall be attached to hoisted materials that require steadying or guidance?
A. **Taglines.**
- 33.Q. How often shall each active surface installation be examined by a certified person?
A. **At least once during each working shift or more often if necessary for safety.**
34. Q. What are the requirements of the records when a certified person examines an active surface installation?
A. **A record book shall be kept at the mine, with action taken to abate hazards and shall be countersigned.**
- 35.Q. What are the requirements when, at any time, the air in any structure, enclosure or other facility contains 1.0 volume per centum of methane?
A. **Changes or adjustments in the ventilation of such installation shall be made at once.**
- 36.Q. Travel-ways and platforms where persons are required to travel or work shall be kept clear of:
A. **Stumbling or slipping hazards.**
- 37.Q. What safety devices should be used when working above ground level?
A. **Wear a safety belt or harness.**
- 38.Q. What must be provided in and on all surface structures, paths, walkways, stairways, switch panels and working areas?
A. **Sufficient illumination.**
- 39.Q. Opening in surface installations through which men or material may fall shall be protected by:
A. **Railings, barriers, or covers**
- 40.Q. Steep or vertical ladders, which are used regularly at fixed locations shall be:

A. **Anchored securely.**

Section 6 Pre/On-shift Records

The examiner must utilize the completed On-shift report forms and the examination exercise provided to key grading of the On-shift section of the exam. Discretion may be used in evaluating how hazardous conditions and action taken are recorded. The score for this section of the examination includes discount totals from both the identifying hazardous conditions portion and the On-shift report portion of the exam. The following discounts will be given for each prescribed area listed:

| Area | Discount Points |
|---|------------------------|
| • Failure to identify hazardous condition | 3 |
| • Failure to record hazardous condition | 3 |
| • Failure to record action taken when correcting hazardous condition | 2 |
| • Failure to record other required information other than hazardous condition or action taken | 1 |

**Surface Facilities Foreman Certification
On-shift Exercise Instructions (SFF Exam)
Student Study Guide**

Exam Instructions: You are required to read the following scenario and complete the attached forms as part of your examination.

You are a surface facilities foreman, certification number 01525, employed at the Clean Coal Lab and Sampling Company. On Monday, March 8, 2005, you begin your on-shift examination of your work area at approximately 8:00 A.M., completing it by 10:00 A.M.

Your examination begins at the coal storage area located at the back of the laboratory. The loader operator had completed a pre-op inspection of the Caterpillar 77 Loader and found the headlights inoperative. The loader operator stated he would report this to the repairman.

The coal sampling facility was next examined. Here you notice that the ramp area leading to the bag storage room has loose coal on the runway. You have one of your personnel clean the loose coal up. As you examined the sampling room, you notice that a guard was missing off the grinding augers for the #9 sampler. In addition, two 110 volt outlet covers next to the sampler have been damaged exposing lead wires to the outlets. Both the #9 sampling auger and the two outlets have been taken out of service.

You later travel to examine the lab work area. All fire extinguishers, fire hoses and water hydrants located in the lab were examined and found to be in compliance. Five (5) coal blenders were examined. The #2-blender deflector glass, reported to be broken, had been removed and not replaced. The blender was still being utilized. You had the blender taken out of service.

As you examine the picking table, you notice that the guard was missing off the drive pulley. You have the certified electrician replace the guard. Discussions you have with him reveal that the door for the laboratory breaker box had been left open. It is a requirement to keep the breaker box closed and locked. He also informs you that the #2 welder located in the parts room was knocked over. It appeared to have the outside casing damaged exposing the internal components. The welder was not in use.

**Surface Facilities Foreman Certification
On-shift Exercise Instructions (SFF Exam)
Student Study Guide**

- Read the exercise statement provided
- Identify hazardous conditions by marking the appropriate boxes. (**Note: A hazardous condition is defined as a condition that is likely to cause death or serious personal injury to persons exposed to such conditions.**)
- All conditions identified as hazardous conditions shall require corrective action to be taken.
- Any condition marked below that is **not** a hazardous condition will be discounted. **All** hazardous conditions marked below must be entered in the On-shift examination records.
 - Complete the On-shift examination records attached.

- | |
|--|
| <p>[X] Head lights and brakes inoperative on the Caterpillar 77 loader</p> <p>[] Loose coal located on the ramp leading to the bag storage room</p> <p>[X] Guard missing off the #9 sampler-grinding auger</p> <p>[X] 110 volt outlet covers next to the #9 sampler damaged exposing lead wires</p> <p>[] #2 blender deflector glass missing</p> <p>[X] Guard missing off the drive pulley for the picking table</p> <p>[] Breaker box for the laboratory left unlocked</p> <p>[X] Outside casing to the #2 energized welder damaged exposing internal components</p> |
|--|

**Surface Facilities Foreman Certification
On-shift Examination Report (SFF Exam)
Student Study Guide**

Date of Examination 5/1/2018
Sampling Company

Facility/Area Examined Clean Coal Lab and

Time of Examination 8 – 10 AM
Midnight Shift _____

Day Shift __X__ Evening Shift _____

Results of On-shift Examinations

| Location | Hazardous Condition | Action Taken |
|-----------------------|--|--|
| Coal Storage Area | | |
| Caterpillar 77 loader | Head lights and brakes inoperative on the | Headlights and brakes were repaired |
| Sampling Facility | Guard missing off the #9 sampler grinding auger Outlet covers damaged at #9 sampler | Taken out of service Taken out of service |
| Laboratory | Guard missing off the drive pulley for picking table | Replaced |
| #2 Welder | Outside casing to the #2 energized welder was damaged exposing internal components | The outside casing was repaired |

*Work Area *Shop*Lab *Warehouse

Condition of structures, travelways, walkways

Loose coal located on the ramp leading to the bag storage room. Cleaned up

Other conditions

Condition of fire fighting equipment

5/1/2018

01525

Surface Facilities Foreman
Certification Number

Date

Operator/Agent

Date

**PRE-OPERATIONAL CHECKLIST
FOR SURFACE MOBILE EQUIPMENT**

Company Name: _____ Mine Number: _____
 Date: _____ Shift: 1st 2nd 3rd
 Equipment or Company Number: _____
 Type of Equipment: _____
 Hour Meter Reading: _____

Time Date

O.K. Description of Repairs Required Reported

Corrected

| | | | |
|-------------------------------------|--|--|--|
| 1. Park Brake | | | |
| 2. Service Brake | | | |
| 3. Engine Brake | | | |
| 4. Cab Conditions | | | |
| 5. Fire Hazards | | | |
| 6. Fire Extinguisher | | | |
| 7. Exhaust System | | | |
| 8. Wipers/Windshield | | | |
| 9. Lights | | | |
| 10. Glass Windows | | | |
| 11. Mirrors | | | |
| 12. Horn/Front | | | |
| 13. Gauges and Instruments | | | |
| 14. Back-up Alarm | | | |
| 15. Steps/Ladders/Rails | | | |
| 16. Air Systems Proper Operation | | | |
| 17. Seat Belts | | | |
| 18. Bed Pins/Safety Props/Catches . | | | |
| 19. ROPS/FOPS | | | |
| 20. Guards | | | |
| 21. Tires/Tracks | | | |
| 22. Fluid Levels/Leaks | | | |
| 23. Rims/Rings/Lugs/Spacers | | | |
| 24. Steering Components | | | |
| 25. Front Suspension | | | |
| 26. Rear Suspension | | | |
| 27. Transmission | | | |
| 28. Frame/Components | | | |
| 29. *Communications/Radios | | | |

Comments: _____

Signature of Operator: _____

* Not Required by State or Federal Laws

Section 7 Ground Control

A. Virginia Mine Safety Laws

45.1-161.287. Ground control

45.1-161.287.A.

All surface coal mining operations shall establish and follow a **ground control plan approved by the Chief** to ensure the safety of workers and others affected by the operations. The ground control plan shall be consistent with prudent engineering design. Mining methods shall **ensure wall and bank stability, including benching, to obtain a safe overall slope.** The ground control plan shall also **ensure the safety of persons (i) in residences or other occupied buildings, (ii) working or traveling on any roadway, and (iii) in any other area where persons congregate, work or travel that may be affected by blasting or falling, sliding, or other uncontrolled movement of material.** The plan shall identify how residents or occupants of other buildings located down the slope from active workings will be notified when ground disturbing activities will take place above them and what actions will be taken to protect such residents or occupants from ground control failures during the work.

45.1-161.287.B.

Scaling and removal of loose hazardous material from the tops of pits and highwalls, banks, walls and benches shall be completed to **assure a safe work area.**

45.1.161.287.C.

Employees and other persons, except those involved in correction of the condition, shall be restricted from areas where hazardous highwall or pit conditions exist.

45.1.161.287.D.

Unless required for the purpose of repairs, all persons shall be **restricted from areas between equipment and walls, benches, or banks** if the equipment may hinder their escape from falling or sliding material. Special precautions shall be taken when persons are required to perform such repairs.

45.1-161.291.G.

The ground control plan shall include other administrative, engineering, and source controls provided for safe operations.

B. Tree removal

Highwalls, including existing highwalls, **shall be cleared of all trees**, brush, and loose material that create a hazard to workers.

Persons having to work in close proximity to the top of a **highwall to remove trees, brush, or loose material will be secured by a harness/belt** and rope or similar device or work will be done utilizing equipment designed to do such work.

Trees, which need to be, removed which have a potential to contact energized power lines will be removed in a manner that does not expose workers to contact with such lines. This may include using cables, ropes or de-energizing the electrical power from the lines. The owner of the power line will be notified prior to work being performed and in the event of any damage to the power line.

C. Highwall and Spoil Banks

The foreman will coordinate with the driller and blaster to ensure each highwall blast is planned in such a manner, which would minimize any adverse effect to the highwall. This coordination will include results of the previous blast(s) and conditions found during drilling such as transitions of different types of rock, mud/hill seams and/or voids. This coordination will determine the pattern for the next blasting cycle relative to hole spacing, hole depth, explosive poundages, etc.

Pit widths will be designed in such a manner to allow for safe operation of all the equipment used in the pit.

The highwall will be sloped back at least 5 degrees past the vertical. Existing highwalls and pre-split highwalls are exempt from this standard.

Loose material will be removed, using appropriate equipment, from the highwall as it is exposed.

Safety bench(s) or other no less effective control measures will be used where the highwall is susceptible to material sloughing. A minimum 30' safety bench will be installed within the first 150' of all highwalls.

Equipment operated where there are potential hazards from highwalls will have adequate protection from falling material.

When a machine, equipped with a side operator's cab (i.e. excavator, drill), is operating at the base of a highwall, the operator will **position the equipment so that the operator's cab is not located between the machine and the highwall.**

In isolated instances where it is not possible to keep the operator's cab of the machine away from the highwall, the machine will be positioned at an angle of at least 45 degrees from the highwall (the position of the tracks on the machine will

determine the angle from the highwall). Additionally, prior to moving the machine into the area, the highwall will be evaluated to determine if a hazardous condition exists. If no hazard exists, a spotter will be positioned in a safe location away from the wall where the highwall can be monitored during the time the machine is being operated in this position. The spotter will be equipped with a means of communicating directly with the equipment operator.

Operating equipment near highwalls and spoil banks, such as loading haulers, will be performed in a manner so that exposure time near the highwall is minimized and that the equipment operator is positioned in the safest location away from the highwall.

Spoil banks will be moved in a manner, which does not create an overhang, which exposes workers to, hazards from falling or sliding material. Dozers or other equipment will be used to break down the upper portion of spoil banks in order to prevent overhangs and other hazards.

Spoil banks adjacent to all active mining pits, where equipment and men are exposed, will be constructed on a safe slope and in such a manner to protect persons from falling or sliding material. Where spoil banks become so steep that hazardous conditions exist for equipment and men working under them, action will be taken immediately to correct the hazardous condition.

During the shift, the surface foreman will examine highwalls and spoil banks for hazardous conditions prior to maintenance personnel and other personnel such as blasters, surveyors, or coal samplers entering the assigned work area near a highwall or spoil bank.

All persons working in close proximity to highwalls will visually examine the wall prior to starting work and as frequently thereafter, as may be necessary to ensure safety. If conditions prevent a visual examination of the wall, work will stop in the affected area, workers will consult with the foreman to discuss conditions, and alternatives such as maintaining a safe distance from the wall (a minimum of 50') or working in alternate areas until a visual examination can be made of the wall.

Adequate lighting will be provided during low light conditions to ensure that adequate examinations can be made of highwall and spoil bank areas where men are working or will be assigned to work.

Highwalls, spoil banks or **other areas that may potentially be affected by a heavy rain, extended periods of rain or freeze/thaw conditions will be examined during and after such occurrences and prior to persons working in such areas.** These examinations will be conducted and recorded in accordance with 45.1-161.256A.

If a **hazardous condition is found during any examination, the foreman will be notified immediately and the condition will be corrected or dangered off.** If the condition is dangered off, a “Danger” sign or “Danger”, tape that is readily visible in all conditions will be placed in a conspicuous place(s) to effectively prevent entrance into the area. This method of identifying areas where hazardous conditions exist will be reviewed with all employees and will be posted at the mine site.

Any hazardous condition found during the examinations of the mine will be recorded in the appropriate record book. It will be designated as “corrected or dangered off” by the examiner. The on-coming foreman will review the examinations by the preceding examiner prior to assigning work to employees. Any hazardous condition that has not been corrected will be reviewed with all affected employees.

Any hazardous condition that has been “dangered off” or not corrected will be recorded in the appropriate record book and carried forward by each foreman until such condition is corrected.

D. Exposure

All work will be done in a manner that minimizes unnecessary exposure time to highwalls.

Equipment in need of servicing, repairs, fuel, etc. will be **moved away from the highwall to minimize exposure to employees from falling or sliding material.**

If it is not possible to move the equipment away from the highwall, the only work to be done is work that enables the equipment to be moved to a safe location away from the highwall. While the work to move the equipment is being done, a spotter will be used to observe the highwall for sliding or falling material.

Explosive trucks, which are in the process of loading holes, will incorporate the use of auger booms, remote operation, truck positioning or other no less effective method to maintain a safe distance from the highwall. **Exposure time to ground personnel doing work in close proximity to the highwall will be limited.** Only those persons necessary to perform work will be allowed in this area.

An authorized person will constantly observe the conditions of the highwall when ground personnel are working in high risk areas as determined by the condition and height of the wall. This will include but not be limited to workers backfilling blasting holes, preparing explosives for blasting, surveyors, equipment helpers, etc.

Explosives will not be loaded within a minimum of one hole on each side of the drill.

Equipment will not be parked or left unattended near the highwall where it is exposed to falling material.

E. Roadways

Haul roads, including roads used for the removal of coal from pits, to the extent possible, will be constructed a safe distance away from highwalls, to minimize exposure to falling or sliding materials.

Roadways that are exposed to upslope dumping or ground disturbing activities, including blasting will be protected by effective means utilized to ensure the safety of persons and vehicles traveling on any roadway.

Spoil banks adjacent to active roads will be maintained in such a manner to protect persons from hazardous conditions.

F. Mine Map

A map will be maintained at the mine site showing residences, businesses, public buildings, and public or private roads that may be affected by mining activities.

Temporary notations to include updates of gas wells, gas lines, and other potentially mine affected changes will be updated on a map when they become known.

All red zone areas of the mine will be clearly identified on the map by highlighting or other no less effective means. **Red zones are work areas where ground disturbing activities are being conducted or will be conducted that represent a potential hazard, from blasting or uncontrolled movement of material down slope, to the safety of persons (not under the control of the licensed mine operation) residing, working, or traveling in affected areas.**

All foremen will be familiar with the contents of the map, the outer perimeter boundaries of the permit area, and the red zones.

G. Working In or Around Red Zones

Warning signs, flagging, or other no less effective means will be used to mark work areas that are designated red zones. The method used to mark these work areas will be distinctively different from other warnings and markings utilized at the mine site.

Berms, fencing, or other barrier protection will be used to contain materials upslope from red zones. In locations where berms, fencing or other barrier protection cannot be used or is not practical, spotters will be used to control work

such that all material is prevented from rolling, slipping, or sliding down slope. No work will be performed upslope in red zones without these precautions in place.

Work activity in red zone areas will be conducted in a safe manner using proper equipment for the work being performed.

Residents or occupants of other buildings, or other persons not under the control of the licensed mine operation, that could be affected by falling, sliding, or other uncontrolled movement of material down slope from red zones will be notified by personal contact or by written notice conspicuously attached to the residence or building at least three hours and no more than 24 hours prior to beginning ground disturbing activities in red zones. Thereafter, residents or occupants of other buildings will be notified at least monthly. This notification is to include the type of work that is planned, the length of time the work is expected to last, and the safety measures that will be used. A record of the notification will be recorded in the on-shift report of the mine or a record book designated for that purpose maintained at the mine site.

Residents or occupants of other buildings, or other persons not under control of the licensed mine operation, that could be affected by blasting in red zone areas will be given notification of the blast at least three hours and no more than 24 hours prior to the blast. At a minimum, residents or occupants of other buildings, or other persons not under the control of the mine operation, within 1,000 feet of any blast are deemed to be affected. However, each blast will be analyzed to determine maximum affected range. Thereafter, residents or occupants of other buildings will be notified at least weekly. This notification is to include the planned schedule of blasting activities, the safety measures that will be used, blasting signals, and precautions the residents should take. A record of the notification will be recorded in the blaster's logbook or a record book designated for that purpose maintained at the mine site.

When blasting in red zone areas or other potentially critical areas such as around electrical transmission towers/lines, gas lines, etc., blasting procedures will be modified such as reducing poundage, reducing the number of shots, reducing the depth and size of drill holes, changing the free face direction, using electronic detonation or implementing other measures to control the potential for damage. Such safety measures will be documented in the blasting log book.

H. Training/Documentation

The contents of this plan and the mine map will be reviewed with all newly employed miners. The surface foreman will ensure that all newly employed miners are familiar with the contents of this plan prior to allowing them to work.

The contents of this plan and the mine map will be reviewed with all miners immediately after approval and during annual re-training.

The applicable contents of this plan will be reviewed with all employees immediately prior to starting work in red zones. The surface foreman will ensure that the employees are aware of the red zones and are familiar with the requirements of this plan and the contents of the mine map.

A record of the training required under this section will be maintained at the mine and open for inspection for a period of one year. A record of the training required under paragraphs a. and b. above will be recorded on the MSHA 5000-23 form by checking the “other” box and indicating the type of training provided. A record of training required by paragraph c. above will be recorded in the on-shift book or other equivalent record of the mine with the names of the employees receiving the training included.

I. Management Control

The surface foreman is responsible and accountable for the implementation of this ground control plan.

The surface foreman will ensure that work assignments and necessary precautions for red zone work is clearly communicated to all affected miners.

The surface foreman will provide direct monitoring and evaluation to ensure that effective control of work in the red zones is maintained in accordance with the ground control plan.

The person countersigning the on-shift report of the surface foreman will ensure that records reflect compliance with any record required by this plan and that any hazardous conditions recorded have been promptly corrected.

Should a situation arise where the mine management cannot comply with the contents of this plan, the surface foreman will consult with appropriate company management to seek alternative methods that offer an equal level of safety or greater. The Chief of the Division of Mines must approve any variance from this plan.

This plan will be incorporated into the DMLR coal surface mining permit plan. DM and DMLR will jointly enforce provisions of this plan.

Section 8 MSHA Compliance Assistance Guide for Tree Cutting On Mine Property

A. Training

Tree cutting has associated hazards that need to be covered by training under Part 48 (Subpart B), of Title 30, Code of Federal Regulations.

Contractors, which cut trees on the mine property as mine service work for frequent or extended periods, are subject to the comprehensive training requirements under Part 48. Such contractors, which are not on the mine property for frequent or extended periods, must receive hazard training under Section 48.31. Some mine employees also cut trees. Mine employee training may need to be supplemented, such as in task and annual refresher training, to cover tree cutting.

Other persons, who are involved in timbering or tree harvesting unrelated to the mining operation but who are incidentally exposed to mining hazards, generally receive the hazard training under Part 48.

The Part 48 training applies to all surface mines and surface areas of underground mines. The Part 48 regulations cover new and experienced miners, annual refresher and task training. This type of training is commonly called "comprehensive training." **Comprehensive training is required for workers who are regularly exposed to mine hazards,** or who are service workers employed or contracted by the operator to work at the mine for frequent or extended periods. Per existing policy, "frequent" exposure involves a pattern of recurring exposure, and "extended" exposure is exposure of more than five consecutive workdays.

Under both Parts 48 workers who are not required to have comprehensive training, take hazard training.

30 CFR, 48.26 (b) requires experienced miner training for new employees or transferred employees before beginning work duties. Experienced miner training must be conducted under the parameters of an approved training plan and the task

training portion of experienced miner training **must include the hazards involved with tree cutting** for employees who actually perform tree cutting.

B. Safety Program

30 CFR, 77.1708 requires each operator to establish and maintain **a program of instruction with respect to safety** regulations and procedures to be followed. The program is to be published and distributed to each employee and distributed in conspicuous places.

C. Examinations

30 CFR, 77.1713 (a) requires **examinations by a certified person of each working area of the mine at least once during each shift.**

D. General Requirements

MSHA has jurisdiction over tree cutting and the full range of training may apply, if the answers to the following two questions are

1. Is the tree cutting on mine property?
2. Is the tree cutting associated with mining, i.e., a precursor to mining or done for mining purposes?

*This excludes, for example, tree harvesting not associated with mining.

Tree cutters on mine property but are not associated with mining will receive hazard training (Part 48) consistent with their exposure to any mining hazards, such as on haul roads.

Tree cutters are surface miners, and tree cutting is mine service work.

Typically, contractors perform tree cutting, but regular mine employees may be assigned tree cutting tasks. The Federal Mine Safety and Health Act (Mine Act) defines miner to mean any person working in a mine (Section 3(g)), and mine to include an area of land used in or to be used in mining (Section 3(h)(1)).

If tree cutters are on the mine property for more than five consecutive days, or have a pattern of recurring exposure, they must complete comprehensive training under Part 48 (Subpart B), 30 CFR: new miner, experienced miner, task and annual refresher training, as applicable. If tree cutters are on the mine property for 5 days or less, they must complete hazard training.

Mine employees cutting trees may need to be supplemented, such as in task training and annual refresher training, to cover tree cutting.

Training must be adapted to tree cutting, as appropriate. **Most injuries and fatalities involving tree cutters at mines have been due to hazards of the tree cutting itself.** The content should focus on tree cutting hazards and safe work procedures such as preoperational checks, workplace exams, communications and proper tree cutting and limbing. Tree cutters also must be trained in any other mining facets of which they are a part and mining hazards to which they are exposed.

Can tree cutting training taken under another program be credited toward meeting the MSHA training requirements, particularly for new miners under 46.5 or 48.25? Yes, current and equivalent Occupational Safety and Health Administration (OSHA) or State training, such as West Virginia's 16 hour training, will be credited.

The administrative requirements are the same as for all training plans under either Part 48. Under Part 48, for example, plans must be submitted for MSHA approval and courses taught by MSHA approved instructors.

There are three sources for approved instructors: operators' or contractors' staffs, state grantees, and private vendors. Per 48.23(h), instructors are approved in a number of ways. Individuals may apply based on their specialty and background, which could include tree cutting.

MSHA, for example, has developed a template-training plan as a guide for covering tree cutting performed by contractors. Further assistance in developing and implementing training can be obtained through MSHA's Educational Field Services.

The same MSHA enforcement policy for training in other instances applies concerning tree cutting.

Tree cutting contractors have the same requirements as other mine contractors per Part 45, 30 CFR, and existing MSHA enforcement policy.

Tree cutting as such is not a component of ground control, which serves to stabilize mining features such as highwalls, pits, spoil banks, and benches.

Once MSHA is aware of the tree cutting, MSHA will inspect and assure training is provided as appropriate.

MSHA's inspection should take into account the developmental nature of the activity. The purpose is to check that the tree cutters have completed training as required. Compliance with other appropriate MSHA requirements should be checked such as PPE, noise, communications and guarding. Where MSHA has no standards specifically addressing tree-cutting methods or techniques, MSHA will rely on training to cover acceptable safe practices, unless an imminent danger is present.

If there is no imminent danger and no specific MSHA regulation to enforce, then the MSHA inspector should inform the tree cutter of the unsafe acts and/or conditions and check to make sure the circumstances are covered in the training.

MSHA **will not** enforce OSHA's tree cutting requirements. MSHA will only enforce MSHA regulations. OSHA standards cannot be incorporated by reference. OSHA standards, however, can be used as a guide in determining safe work practices and procedures for tree cutters. **MSHA-required training for tree cutters can be so guided by OSHA material.**

Section 9 Clear Cutting Safety Requirements and Recommendations

A. Foreman and Employee Responsibility

1. The **employer shall provide a safe work environment and enforce safe work practices.**
2. **Each employee shall be held responsible for performing all work in a safe manner** so injuries to that person and to others will be avoided.
3. Employer, supervisor, employee, or designated person shall **instruct new employees in safe practices.**
4. Employees shall be familiar with the location and use of all safety, emergency care, and fire suppression equipment located at the mine site.
5. An employee shall notify his employer or supervisor before attempting any work, which, in the employee's opinion, appears hazardous beyond normal operating conditions.
6. An employee shall report all injuries to his employer or supervisor immediately, regardless of the nature of the injury.
7. Good housekeeping of all work areas and equipment shall be practiced.

B. Personal Safety

1. Any employee who has intoxicating substances in his possession, uses them on the job, or reports to the jobsite under their influence shall be removed from the jobsite immediately and shall be subject to appropriate disciplinary action by the employer.
2. Indulgence in practical jokes, horseplay, scuffling, and other actions deemed unsafe by the employer are forbidden.
3. Employees shall observe and adhere to all relevant employer operations and safety policies.

C. Seat Belts

For each vehicle or machine equipped with ROPS/FOPS or overhead guards, including any vehicle or machine provided by an employee, the employer shall assure that:

- A seat belt is provided for each vehicle or machine operator.
- **Each employee uses the seatbelt while operating vehicle or machine.**
- Each employee securely fastens seat belt to restrain the employee within the vehicle or machine cab.
- Each machine seat belt meets the requirements of the Society of Automotive Engineers Standards (SAE J386, June, 1985).
- Seat belts are not removed, or if removed, are replaced on any unit so equipped at the time of manufacture.
- Each seat belt is maintained in a serviceable condition.

D. Weather Conditions

Work shall be terminated and employees moved to a place of safety when environmental conditions such as but not limited to electrical storms, high winds, heavy snow, heavy rain, extreme cold, dense fog, fires, mudslides, and darkness may endanger employees in the performance of their jobs.

E. Training

1. The employer shall provide training for each employee, including supervisors.
2. Current employees assigned new work tasks, tools, equipment, or machines and new employees prior to starting work shall be trained immediately in at least the following:
 - a. Recognition of and preventive measures for the safety hazards associated with their individual work tasks.
 - b. General recognition and prevention of safety hazards in the logging industry.
 - c. Procedures, practices, and requirements of the employer's worksite.
3. Training must be provided whenever an employee demonstrates unsafe job performance.
4. Employers shall record in writing and maintain a record as proof of compliance dates of training; periods when guidance is provided; and dates on which proficiency is demonstrated for current employees, new hires, and workers who change job responsibilities.

F. Safety Meetings

The employer shall hold safety meetings for each employee, individually or in groups. The employer should maintain a safety meeting record to document the employees present, safety topics discussed, and date of the meeting.

G. Logging Safety

1. Employers shall demonstrate a genuine and consistent concern for safety so employees know logging safety is the company's number one priority.

- Lead by example.
- Never bend the rules.

2. **Employees shall contact the supervisor when:**

- **Any time a situation requires more skills than you have.**
- **If a tree has a larger diameter than the length of the guide bar.**
- **If the tree is dead, hollow, split, or rotten.**
- **If there isn't enough room to safely fell the tree or if there is no clear escape route.**
- **If there are any other obstacles to felling the tree.**

3. Employers shall provide a written safety program.

- Train and closely monitor new employees during their first year on the job (new employees are the employees most likely to suffer an injury).
- Hold regular safety meetings to discuss OSHA, MSHA and Virginia regulations, incidents and close calls, and employee suggestions for safe work habits.
- Obtain First Aid and CPR training.

4. Personal Protective Equipment (PPE)

Require the wearing of all appropriate personal protective equipment. It may save your life, or prevent serious injury.

- OSHA requires hard hats, eye protection, hearing protection, and foot protection for all woods workers.
- **Chain saw operators must wear cut resistant leg protection and logging boots.**
- Equipment operators shall **wear seat belts** and high visibility clothing.

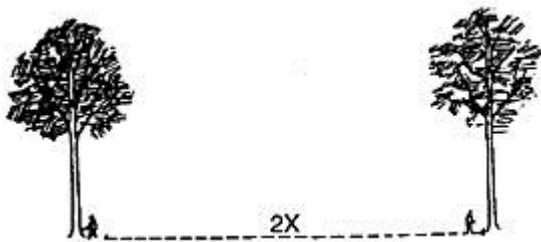
5. Overhead Hazards

Every year dead limbs (**widow makers**), lodged trees, and other overhead hazards kill and maim hundreds of loggers nationwide.

- All woods **workers should practice "heads up"** to avoid possible hazards.
- Train employees to recognize overhead hazards and to safely eliminate the danger; for example, using a skidder to ground a lodged or setback tree before work continues.

6. Safe Work Zone

- Plan work so that woods workers are separated by at least **two tree lengths of the trees being felled.** This is especially important when manual felling or felling with a continuously rotating saw head is being done.



- Watch out for each other! This separation of workers while maintaining visual or audible contact with each other greatly reduces the risk of serious injury if an accident occurs.

7. Safe Direction of Felling

The Bureau of Labor Statistics reports that **logging is one of the most dangerous occupations** in the United States. Of those injured or killed, over **sixty percent were engaged in cutting activities** (felling, limbing, or bucking) with a chain saw at the time of their accidents. Selecting a **safe direction of fall, creating the proper notch and hinge, protecting the hinge during the backcut, and proceeding on the escape path** are some of the steps chain saw operators must take to fell a tree safely in the desired direction.

8. Maintenance of Equipment

On fully mechanized logging operations, the greatest risk of injury occurs during equipment maintenance and repair. Logging safety experts suggest the following:

- **Inspect your equipment before use.**

- Establish a regular, **preventative maintenance** program on all equipment.
- **Safely ground moving elements** before maintenance and repair.
- **Set the parking brake** and place the transmission in park.
- **Use the 3-point mount and dismount technique** to avoid slips, trips, and falls when working on logging machines.

9. Focus on the Work at Hand

Many loggers are injured because they show up to work in poor mental or physical condition. They may be sick, distracted because of personal problems, on drugs, tired, or hung over. Send these workers home rather than risk injury. Exercise regularly and eat healthy. Leave personal problems at home.

10. Work Safely

Remember, no job is so important that your safety has to be jeopardized to accomplish it. Do not hurry! It is hard not to hurry at times, especially during periods of daily quotas.

H. Personal Protective Equipment

The **use of proper personal protective equipment (PPE) is essential** for reducing logger injuries. Often hazardous elements cannot be removed or corrected, therefore, it is vital to protect the worker. **Proper personal protective equipment is as important a part of any logging operation** as a chainsaw, skidder, and loader. Being a professional logger means wearing safety equipment every day. Proper personal protective equipment properly used can greatly reduce the number of logger injuries.

- **The employer shall provide gloves, leg protection, hard hats, eye protection, and first aid kits.**
- The employer shall assure that personal protective equipment, including personal protective equipment provided by an employee, is maintained in a serviceable condition.
- The employer shall assure that personal protective equipment, including personal protective equipment provided by an employee, is inspected before

initial use each work shift. Defects or damage shall be repaired or the unserviceable personal protective equipment shall be replaced before work is commenced.



I. Hard Hat

Approved hard hats shall be worn by all persons present on the logging operation including log truck drivers and anyone on or near the woods or landing areas.

J. Eye Protection

Safety glasses, face shields, or goggles shall be worn by all workers involved in activities where wood chips, sawdust, flying particles, foreign objects (twigs, limbs, and branches) may injure, puncture, scratch, or damage workers' eyes. Eye protection shall be required for chainsaw operators and for equipment operators where cab protection or a windshield is not adequate.

K. Hearing Protection

All workers operating chainsaws or woods equipment shall wear hearing protection.

All workers in the immediate area of any mechanized equipment shall use hearing protection.

L. Safety Footwear

All workers shall wear heavy-duty logging boots that are waterproof or water repellent, cover and provide support to the ankle and protect the employee from penetration by chainsaws. Chainsaw operators must wear boots or socks or over boots that will protect them against contact with a running chainsaw. "Slip on" boots are not to be used by workers involved in logging operations due to the lack of adequate ankle support.

M. Safety Chainsaw Chaps or Safety Pants

All timber fellers, limbers and buckers, and any other workers using chainsaws shall wear chaps or safety pants. Leg protection of ballistic nylon or other leg protection the employer demonstrates provides equivalent protection **shall be used and shall cover the full length of the thigh to the top of the boot on each leg.**

Chainsaw cuts to the legs are one of the most frequent injuries reported from logging operations. When chainsaw operators use leg protection, the chances for saw cuts are greatly reduced. There are many varieties of leg protection available, which are lightweight, comfortable, and affordable. Leg protection provides a saw operator reaction time to remove the saw from the leg area before a severe injury occurs. Protective chaps or pants have proven to be effective in reducing the frequency and severity of chainsaw cuts to the legs

N. Hand Protection

All workers handling wire rope shall wear Cotton gloves or other suitable gloves providing equivalent protection. Employees handling cable or wire rope, operating a chainsaw, or performing other work potentially hazardous to hands shall wear hand protection.

O. Respiratory Protection

Respiratory protection shall be provided and used where workers are exposed to dust, smoke, gas fumes, vapors, sprays, or adverse environmental conditions that may affect breathing. **Workers shall wear respiratory protection where operator cabs are not properly enclosed and where workers are exposed to such conditions as extreme dust, engine fumes, and engine smoke.** Workers shall be trained in the use of respiratory protection

P. Clothing

Woods workers shall wear properly fitted clothes, which are appropriate for the job. Floppy cuffs, dangling shirttails, loose or frayed material that might catch or snag on equipment controls, moving parts, handles, doors, etc. should not be worn. Cuffless pants should be worn.

Q. Hand Tool Safety

Many types of hand tools are used on logging operations. These tools vary from axes and pickaroons to files, wrenches, and other small hand tools, which are used to repair and maintain logging equipment and vehicles. Personal safety is very important when using hand tools.

Employers shall assure that each **hand and portable powered tool, including any provided by an employee, is maintained in safe operating condition.**

R. Axes

In recent years the frequency of axe related injuries has declined, due to mechanization of logging operations. Nevertheless, loggers still use axes, and improperly used, they can cause serious injuries. Many of these safety guidelines apply when using machetes, brush hooks, and other hand held cutting tools.

- Proper personal protective equipment (shin guards, etc.) shall be worn when using an axe.
- Always keep the axe sharp. A sharp, well-honed axe is safer to use. A dull axe may glance off wood and strike the user.
- Make sure the handle is clean and free of cracks or splits and the axe head is securely fastened to the handle.
- Before swinging the axe, check the surrounding area to ensure that overhanging brush, limbs, trees, and other obstructions are clear of the swing path.
- Position feet firmly so you can swing the axe naturally. Maintain a firm grip on the handle with both hands. Be sure the follow through is not in line with feet or legs. Maintain a safe distance from other workers.
- Swing the axe like a baseball bat, not like a pendulum. Always swing away from your body and toward the cut.
- When limbing stand with the tree trunk between you and the limb being cut.

- Do not use the axe to pull logs. The axe is a cutting tool, with the blade designed to pull out of wood when the handle is pulled. It cannot do the work of a picaroon.
- When carrying the axe grasp the handle directly behind the head and carry it with the blade pointing down or away from the body. Never carry the axe with the blade on your shoulder.
- When the axe is not in use, place it in plain view a safe distance from the work area with the axe blade protected by a sheath or metal guard.

S. Picaroons

Picaroons should be kept properly shaped and securely fastened to the handle. The heads of picaroons must be properly shaped or the user runs the risk of pulling free of the stick of pulpwood. The point should be sharp so it will cut through the fiber and hold firmly until the handle is twisted for removal. The picaroon head should be bolted directly to the handle to reduce the possibility of the head pulling loose from the handle.

Check the handle for splitting and cracking. Replace broken, split, or faulty handles before use. Use both hands to control the picaroon. Always reset the picaroon on each pull.

T. Chainsaw Safety

Chainsaws are an integral part of many logging operations. **Over 40,000 people are injured in chainsaw accidents each year.** The two most injured areas are the front left thigh and the back of the left hand. When a chainsaw is at full speed, more than 600 teeth pass a given point per second. **A chainsaw can move as fast as 60 miles per hour.** A muffler on a chainsaw can reach as high as 900 degrees Fahrenheit.

Kickback is the single greatest cause of injury to chain saw users. Twenty percent of chainsaw injuries are the results of saw "kickback." Kickback occurs when the saw bar tip or the top of the saw bar strikes an object and throws the saw in the direction of the operator. Severe injuries are reported to the legs, hands, arms, and face. Proper training, techniques, equipment, and personal protective equipment (PPE) can reduce the potential of kickback and chainsaw related injuries.

Safety **precautions to reduce kickback** injuries include:

- **NEVER** cut with the tip of the chain saw!
- Lock your front elbow.
- Be careful not to cut through nails or knots in the wood.
- Stand to the side.
- Use a low kickback chain.
- Use a chain brake.
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Chainsaw Operation

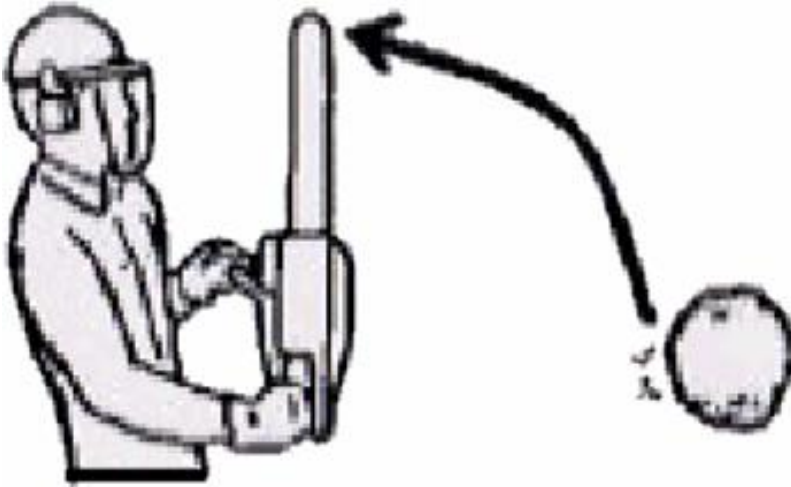
Safe Behavior

- **Inspect chainsaw before use** for proper chain tension, good repair, loose bolts and screws, levels of fuel and chain lubricant, filter conditions, and safety features.
- **Wear all appropriate personal protective equipment** (PPE).
- Start chainsaw from a stable surface clear of debris and combustible material.
- Position body properly and pull starter rope after setting chain brake, turning on switch, and positioning choke.
- Once started, release trigger and be sure chain does not move during idle.
- Never carry chainsaw unless chain brake is on or engine is off.
- Keep blade pointed to the rear when carrying the chainsaw.
- **Inspect the work area for hazards and plan an escape route before cutting.**
- Never cut above shoulder level.
- Keep chain teeth sharp.
- Control the chainsaw at all times with “thumb-lock” hand position.

- Use proper open-faced cutting technique to directionally fell trees.
- Avoid turning or rolling of logs during limbing and topping.
- Take rest breaks when necessary.

Chainsaw injuries include:

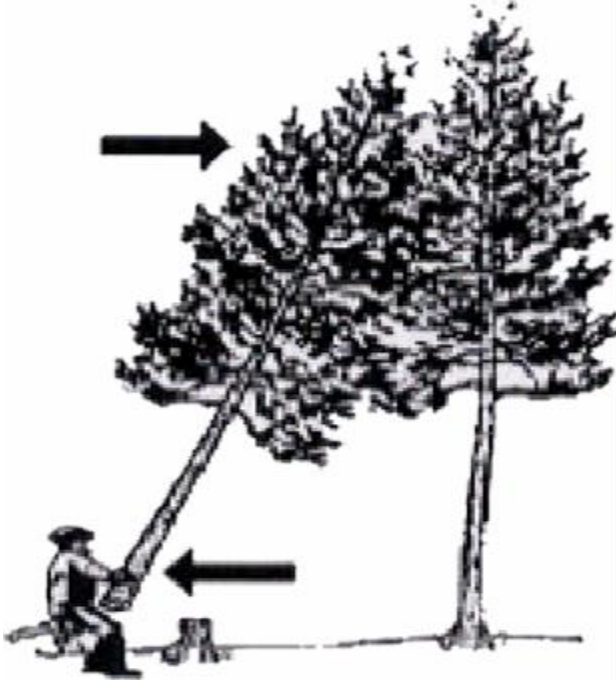
- Kickback



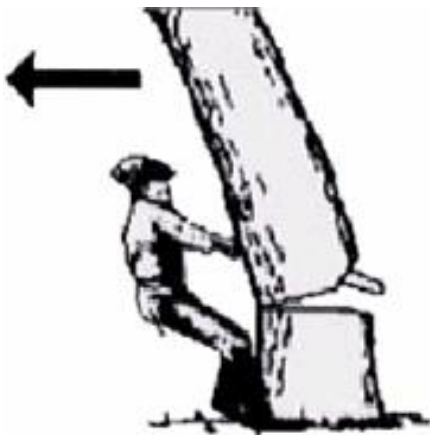
- Widow maker is caused by loose branches falling from the tree due to vibrations from the chain saw.



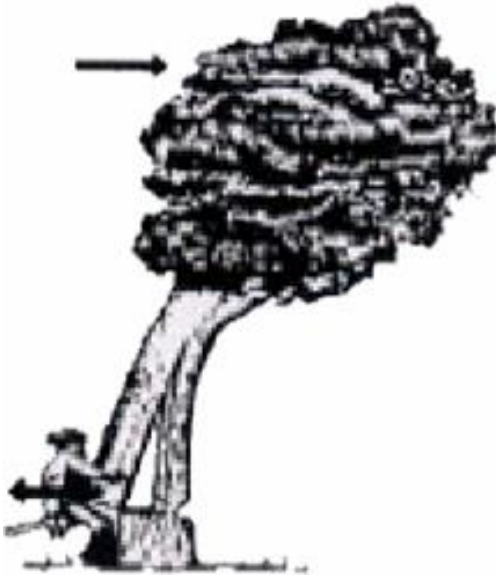
- Stump Jump: This is caused by the hinge being cut or breaking when the tree is falling. The tree can jump or roll, or hit other trees in any direction.



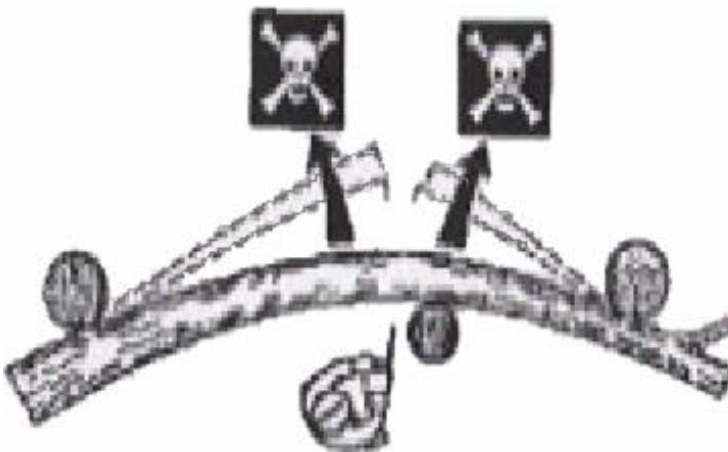
- Setback: Sometimes a tree may tilt backward and clamp onto the bar of the saw. If the hinge breaks, then the tree can fall backward.



- Barber Chair: When the backcut has been made, if the tree leans too far, the butt of the tree can kick backward. This happens much faster than a normal reaction time.



- Spring pole: A tree can become arched as it is felled or if another tree falls on it. When cut, it can violently strike out at anything in its path.



- Vibration syndrome causes frequent users of chain saws to get white knuckles and a loss of feeling in their fingers from the vibrations of the chain saw.
- Moving Tree: A rolling or moving tree can catch your leg or crush you. This can occur when limbs or restraints are removed.
- Crown Shatter: This occurs when the crown of the tree that has been felled or a nearby tree snaps or shatters. This causes hurling branches and can cause serious injury or death.
- Entanglement: Trees that are being cut down may sometimes drag or snap other trees.

Chainsaw safety features should include:

- Low kickback saw chain
- Hand guard
- Safety tip
- Chain brake
- Vibration reduction system
- Spark arrestor on gasoline modules
- Chain Catcher and
- Bumper spikes
- Keep the chain saw handle clean and dry.
- Make sure that the handle is free from oil or fuel.
- Keep your chain saw properly maintained.
- Follow the manufacturer's suggestions for sharpening and maintaining the equipment.
- **Never use a chain saw to cut anything other than wood!**

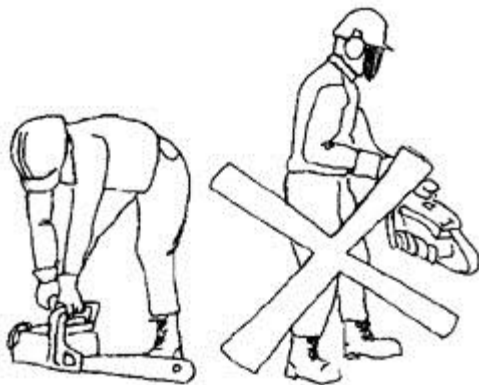
IMPORTANT: Refer to the chainsaw manufacturer's operators manual before operating any chainsaw.

Safety Guidelines when using a chainsaw

- All saw operators shall use proper personal protective equipment (PPE).
- Transporting the chainsaw:
By Hand: Stop the chainsaw engine. The scabbard should be covering the bar to prevent cuts. The chain brake should be engaged. Grip the saw

handle and place the muffler at the side away from the body with the guide bar to the rear.

- **By Vehicle:** Keep the chain and bar covered with a chain guard. Properly secure the saw to prevent turnover, fuel and oil spillage, and damage to the saw.
- Chainsaws shall be equipped with a chainbrake, and shall otherwise meet the requirements of the ANSI B 175.1 - 1991 "Safety Requirements for Gasoline Owner Chainsaws."
- Do not remove or disable chainsaw kickback devices. **Under no circumstances should the chainbrake be removed.** Bow saws should be equipped with top and bottom guards.
- Maintain handles, chainbrakes, chain, and covers for safe operation. Use low kick back chain (safety saw chain).
- Starting the chainsaw:
 - a. Always start the chainsaw with the chainbrake engaged.
 - b. **Always start the saw on the ground.**
 - c. **DO NOT DROP START A SAW OR START A SAW ON YOUR KNEE.**
 - d. Hold the top handle firmly, and make an even pull on the starter rope.



- Adjust the engine idle speed so the chain is not moving when the engine is idling.
- When moving from tree to tree or when moving to another work area within 50 feet, where hazardous conditions exist or when moving farther than 50 feet, stop the chainsaw or engage the chainbrake.

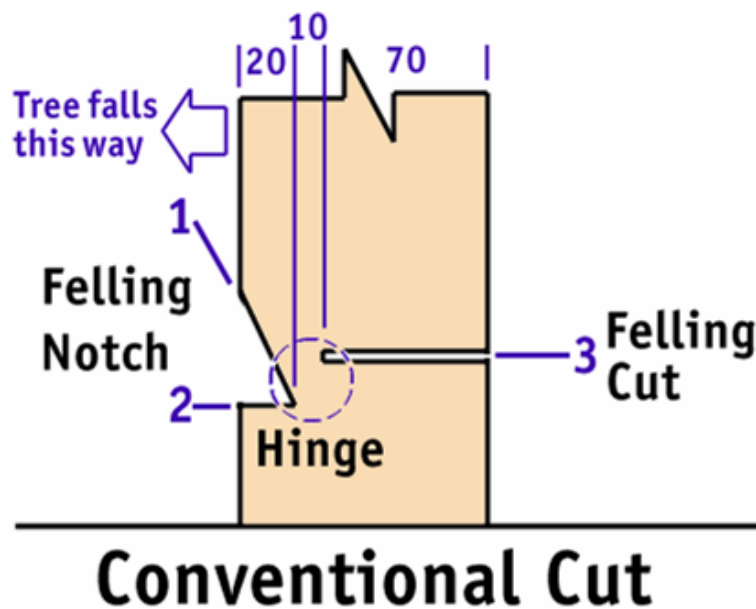
- Always maintain a firm grip with both hands on the saw for control. Position the thumb and fingers around the top handle grip for best and safest control.
- Never use the saw above shoulder height and **never over reach**. The chainsaw shall not be used to cut directly overhead.
- Always keep the bar nose clear of other objects during cutting to prevent kickback. Avoid cutting with the upper part of the bar or use extreme caution when this technique cannot be avoided.
- Before refueling, if possible allow the saw to cool. Refuel in a clean area on bare soil. Chainsaws shall be fueled at a distance not less than 10-feet from an open flame or potential source of ignition. Use an OSHA approved fuel can. Wipe fuel and oil spills from the saw. Move at least 10-feet from the fueling spot before starting the engine.
- Do not operate a chainsaw when tired. Overtired operators have less control and are more accident-prone.
- Keep a first aid kit and fire extinguisher within a reasonable distance of chainsaw operations.

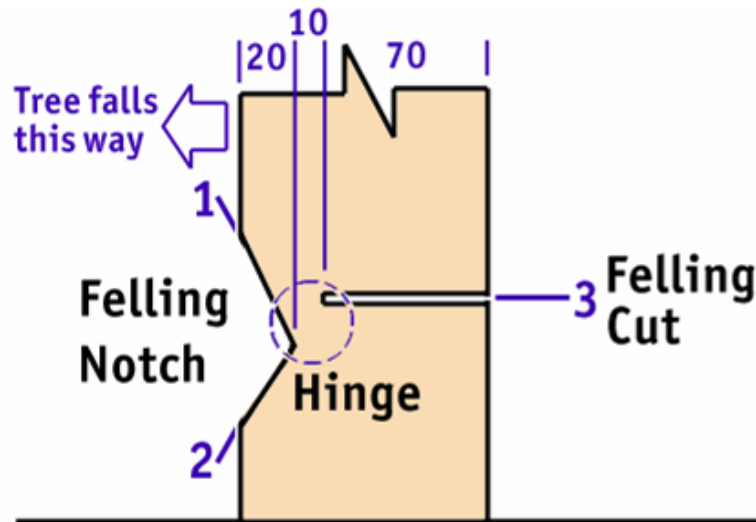
U. Felling Safety

Felling timber is recognized as the most hazardous job in logging. Safety in felling must be the most important goal of the job. More workers are severely injured, maimed, or killed while felling timber than in any other phase of the logging operation. Proper training, planning, felling techniques, safety, and common sense will not only ensure safe operation, but will increase the quality of the cut log.

- Use proper personal protective equipment.
- Clear the area around the tree of brush and other obstructions before cutting.
- Each tree shall be checked for lean, limbs, shape, crook, wind direction, butt defects and dead, lodged limbs. Plan the tree's direction of fall. Observe and allow for hazards in surrounding trees, which may be "triggered" by the tree being felled.
- **Plan and clear an escape path at a 45-degree angle in the opposite direction to the planned direction of tree fall.**

- Employees shall be spaced and duties organized such that the actions of one employee will not create hazards for other personnel.
- Work areas shall be assigned so that trees cannot fall into an adjacent occupied work area. The distance between adjacent occupied work areas shall be **at least two tree lengths** of the trees being felled.
- Make the proper undercut on all trees regardless of size. Never cut a standing tree completely through in one continuous cut. Leave a sufficient hinge of wood between the undercut and felling cut. This helps reduce tree kickback and maintain control of the direction of tree fall. Undercuts are required unless employer demonstrates felling without undercuts will not create an employee hazard.
- A **Felling Notch** does not exceed 20 percent of the tree's diameter at breast height. This cut is made first.
- The **Hinge** is the 10 percent that is left uncut for the operator's safety.
- The **Felling Cut** is made last. It occurs on the opposite side of the tree from the felling notch, but it does not go all the way through the tree. The notch and the cut are staggered, so they do not meet.





Open Face Cut

-
- Use wedges when necessary to aid the direction of the fall.
- Backcuts shall be above the level of the horizontal cut of the undercut. Exceptions: The backcut may be at or below the horizontal cut in tree pulling operations.
- Always keep to the side of the tree being felled. When the tree starts to fall, stop the engine or engage the chain brake, withdraw the bar, and walk away on the preplanned escape path. Never turn your back on the falling tree. Beware of falling limbs.
- **Do not approach a chainsaw tree faller closer than twice the height of trees being felled until the faller has acknowledged that it is safe to do so.** No one should approach a chainsaw operator while the saw is running. If the employer demonstrates that a team of employees is necessary to manually fell a particular tree, then employees can approach the faller only after the faller has acknowledged it is safe to do so. As an additional precaution, fallers should warn fellow workers of a falling tree with a shout such as "timber."
- Never leave a lodged tree, also called a "danger tree," because it may fall unexpectedly. **Never work in the area of a lodged tree.** Each danger tree shall be felled using mechanical or other

techniques that minimize employee exposure before work is commenced in the area of the danger tree. Always have lodged trees safely pulled or pushed down with the aid of a skidder, tractor, or other heavy equipment.

- If the danger tree is not felled, it shall be marked and no work shall be conducted within two tree lengths of it unless the employer demonstrates that a shorter distance will not create a hazard to employees. **Safely mark the lodged tree**, preferably with high visibility colored plastic tape, and move two tree lengths away from the tree before resuming work.
- Domino falling of trees is prohibited. Falling a single danger tree by falling another single tree into it is not recommended. **Never climb lodged trees or attempt to cut sections out of a lodged tree**. Never cut the tree supporting a lodged tree.
- Use extreme caution when felling timber on windy days.
- Fell trees into clear areas when possible to reduce the chances of lodging a tree.
- **The immediate supervisor shall be consulted when conditions appear unusually hazardous.**

V. Limbing Safety

Limbing is removing branches from fallen trees. Injuries received during limbing operations are mainly chainsaw lacerations to the legs, hands, and arms. These injuries occur when workers are limbing trees with large bushy tops, in thick underbrush, and cutting limbs in a bind. Proper training and limbing technique and use of personal protection can reduce the injury potential.

- Use proper personal protective equipment.
- Make sure footing is sound. Do not get off balance. Stand with feet in the clear.
- Start limbing from the butt end of the tree and work toward the top.
- **On steep slopes always stand on the uphill side of a tree.**
- Limb from the ground. Do not walk on the tree.
- To reduce kickback danger do not limb with the tip of the saw.

- Watch the "spring or jump" of limbs in a bind.
- **Use extreme caution when cutting "spring poles". Make several shallow cuts first to release the tension before completely cutting through.**
- **Using extreme caution and cut supporting limbs last. Cutting these limbs may cause the log to roll.**
- When cutting large limbs, be alert to the chain binding and the saw kicking back.
- To prevent pinching the chainsaw bar do not underbuck freely hanging limbs.
- Maintain a safe operating distance from other felling, skidding, and chainsaw operations.

W.Bucking Safety

The most common injuries received while bucking are saw cuts to the feet and legs. Logs rolling onto workers' legs and feet also cause many injuries. Bucking should be done in as clear an area as possible to avoid saw tip contact with other logs, which may result in kickback.

1. Use proper personal protective equipment.
2. Plan cuts before starting the saw.
3. Stand with legs well apart, braced, and with secure footing. Do not get in an off balance position. Do not stand directly behind the saw while bucking to avoid injury in the event of kickback.
4. Keep legs and feet from under the saw.
5. On steep slopes work on the uphill side. If a tree is in a dangerous position, have a skidder or other proper equipment move it into a safe position.
6. Work from the butt to the top of tree. Never walk on a tree.
7. Keep the saw bar tip clear and avoid using the extreme tip of the saw for bucking, as this may result in a kickback.
8. If using a bar chainsaw, start the undercut first.
9. Bow chainsaws should have their top and bottom chain guards in place at all times.
10. Keep the chain out of contact with rocks, gravel, and the ground.

11. Never leave a log partially cut.
12. Make sure the chain is not turning and keep your finger off the throttle trigger when walking between cuts.
13. Maintain a safe operating distance between you and other fellers, buckers, and logging operations.





X. Equipment Operation and Safety

Logging operations have progressed from manual felling and loading and the use of light tractors for skidding to highly mechanized harvesting operations using cable and grapple rubber tired skidders, various types of felling and bunching machines, delimiting units, hydraulic knuckle boom loaders, bulldozers, and other units of heavy equipment. Each type of equipment is a key part of the timber production process. The equipment units are expensive, tough, highly productive, efficient machines. Each unit must be maintained in order to obtain maximum efficiency and production. A well-trained, responsible operator not only can make the difference in quality, quantity, and safety of production; but also can significantly affect the profit or loss of any operation.

Professional logging equipment operators are in control of their machines. All aspects of operation, maintenance, loss prevention, and safety are incorporated into every phase of their duties. This section provides guidelines for safe work practices, fire prevention, proper preventive maintenance, and safe operations. These guidelines are helpful hints for woods equipment operators and logging contractors. These guidelines are not substitutes for proper training, experience, and common sense. The general guidelines pertain to all equipment units while the individual machine sections may point out other specific guidelines.

Section 10 Gas Detection

When conducting gas detection training you are requested to thoroughly review with the individual the following:

- The properties of mine gases, including discussions on specific gravity & effects of temperature and pressure.
- The list of mine gases with emphasis on methane, oxygen, hydrogen, and carbon dioxide and carbon monoxide.
- Proper procedures for taking a gas test. NOTE: “Hands On” participation by student.
- When and where gas tests are required.
- Procedures when methane is detected in a working place.
- Calibration of gas detection instrument. NOTE: “Hands On” participation by students.
- Duties and responsibilities as a miner under Mine Safety Act.
 -  45.1-161.229
 -  45.1-161.231
 -  45.1-161.232
 -  45.1-161.233

PROPER PROCEDURES FOR TAKING A GAS TEST

- √ Check instrument for mechanical condition. (per manufacturers recommendation)
- √ Check battery for proper voltage level. (per manufacturer's recommendation)
- √ Check mechanical "zero". (per manufacturer's recommendation)
- √ Calibrate (per manufacturer's recommendation) – must be calibrated monthly and more often if needed.
- √ Conduct test for methane by activating detector and reading concentrations 12" from mine roof, face, and floor in the area being examined.
- √ Avoid holding methane detectors in a bleeder for extended periods of time as this will render the sensor defective.
- √ When higher concentrations of methane have been encountered, calibrate your detector as soon as possible.
- √ Avoid synthetic fuels when conducting methane checks since these materials can affect readings and damage sensors.
- √ Protect methane detectors from water and other adverse environmental conditions.

METHANE TESTS ARE REQUIRED

- Prior to energizing equipment in and inby the last open crosscut
- Prior to taking equipment into working place and at 20-minute intervals
- Prior to cutting and welding and continuously during this activity
- Prior to and after detonation of explosives
- During required examinations:
 1. Pre-shift and on-shift examinations of working places.
 2. Required examinations of immediate returns.
 3. Places where methane is likely to accumulate.
 4. Return side of each set of seals.
 5. Weekly examinations of ventilation and bleeder system.

NOTE: Oxygen Deficiency Tests are required during examinations. If oxygen is below 19.5% by volume, ventilation must be improved. Oxygen tests should be made frequently when approaching or around old works.

WHEN METHANE IS DETECTED IN YOUR WORKING PLACE!!



■ **At 1% - stop operations, de-energize at the machine breaker and improve ventilation to reduce below 1%.**

■ **At 1.5% or greater – stop operations, de-energize at the source (power center) and withdraw personnel from affected area expect for those needed to improvements to reduce**

■ **At 5%+, notify your foreman promptly. This will be treated as**
an imminent danger situation which could require withdrawal from the mine. Do not attempt to move or ventilate high concentrations of methane unless you are designated to work to correct the problem and then only at the direction of certified persons and following precautions to avoid potential ignition

Mine Foreman Guide

| Gas | Chemical Sym | Specific Gravit | Explosive Range | Health Hazards | Solubility | Color | Odor | Taste |
|------------------|--|--------------------|-------------------------|--|------------|---------------|--------------------------|-----------------------|
| Air | -- | 1.000 | -- | -- | -- | -- | -- | -- |
| Oxygen | O ₂ | 1.1054 | Supports combustion | Oxygen deficiency: 17% panting, 15% dizziness and headache, 9% unconsciousness, 6% death | Moderate | -- | -- | -- |
| Nitrogen | N | 0.9674 | -- | Asphyxiation (oxygen depletion) | Slight | -- | -- | -- |
| Carbon Dioxide | CO ₂ | 1.5241 | -- | Increases breathing rate. May cause death in high concentration. | Soluble | -- | -- | Acid in concentration |
| Methane | CH ₄ | 0.5545 | 5 to 15% | Asphyxiant (rare) | Slight | -- | -- | -- |
| Carbon Monoxide | CO | 0.9672 | 12.5 to 74.2% | Highly toxic. Can be an asphyxiant. | Slight | -- | -- | -- |
| Nitrogen Dioxide | NO ₂ N ₂ O ₄ | 1.5894 | -- | Highly toxic. Corrosive effect on lungs. May be asphyxiant. | Slight | Reddish brown | Blasting powder | Blasting powder |
| Hydrogen | H ₂ | 0.0695 | 4.0 to Highly explosive | Asphyxiant (oxygen depletion). | -- | -- | -- | -- |
| Hydrogen Sulfide | H ₂ S | 1.1906 | 4.3 to | Highly toxic. Can be an asphyxiant. | Soluble | -- | Rotten eggs | Sweetish |
| Sulfur Dioxide | SO ₂ | 2.2678 | -- | Highly toxic. Can be an asphyxiant. | Highly | -- | Sulfur | Acid |
| Ethane | C ₂ H ₆ | 1.0193 | 3.0 to 12.5% | Asphyxiant (rare) | Slight | -- | -- | -- |
| Propane | C ₃ H ₈ | 1.5625 | 2.12 to | Asphyxiant (rare) | Slight | -- | "Carry" in concentration | -- |
| Butane | C ₄ H ₁₀ | 2.0100 | 1.86 to | Asphyxiant (rare) | Slight | -- | "Carry" in concentration | -- |
| Acetylene | C ₂ H ₂ | 0.9107 | 2.5 to 80% | Only slightly toxic. Asphyxiant (rare) | Only | -- | -- | Garlic |

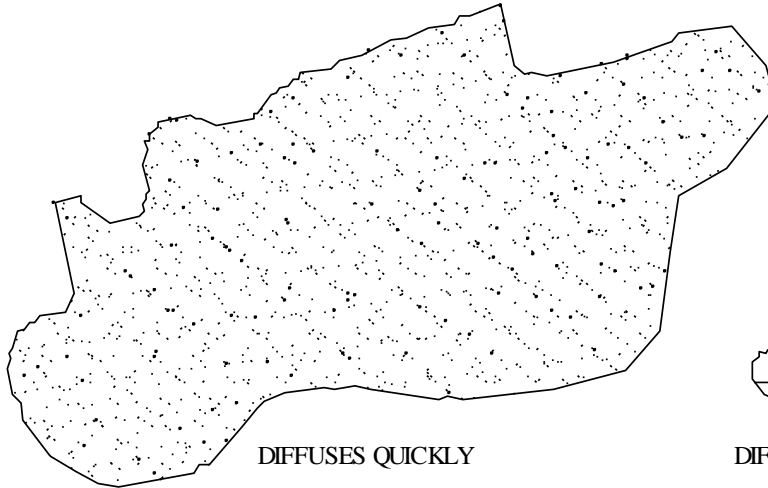
Gas Detection Chart

| Gas | Detection Methods | When to Test |
|-------------------------------------|--|---|
| Oxygen (O ₂) | Oxygen indicator. Flame safety lamp. | During any examination. |
| Nitrogen (N ₂) | Chemical analysis | When an oxygen deficient atmosphere is suspected. In mines where nitrogen issues from rock strata. In inactive areas where ventilation has been inadequate. |
| Carbon Dioxide (CO ₂) | Carbon dioxide detector. Multi-gas detector. | After a fire or explosion. When entering abandoned areas. When reopening sealed areas. |
| Methane (CH ₄) normal | Methane detector. Chemical analysis | During any examination. When ventilation is disrupted. When entering abandoned workings. |
| Carbon Monoxide (CO) | Carbon monoxide detector. Multi-gas detector. Chemical Analysis. | After a fire or explosion. When reopening sealed areas. |
| Nitrogen Dioxide (NO ₂) | Nitrogen dioxide detector. Chemical analysis. Color. | After mine fires or explosions. When diesel equipment is used. After detonation of explosives. |
| Hydrogen (H ₂) | Multi-gas detector. Chemical analysis foam in firefighting | After mine fire or explosion. charging stations. When steam is produced by water, mist or foam in firefighting. |
| Hydrogen sulfide | Hydrogen sulfide | In poorly ventilated areas. During |

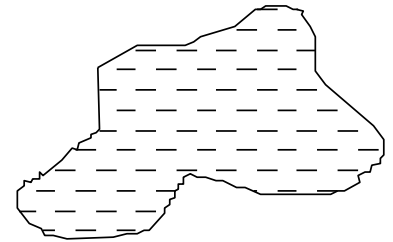
Effects of Temperature and Pressure on Gas

Effects of Temperature on Gas

HOT



COLD

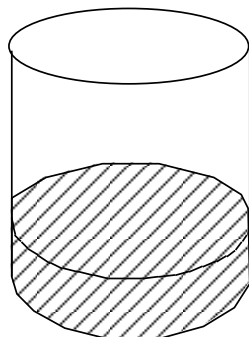


temperature increases - gas expands
temperature decreases - gas contracts

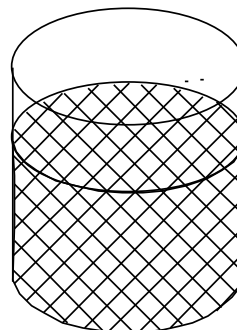
pressure increases - gas contracts
pressure decreases - gas expands

Effects of Pressure on Gas

Pressure Increases

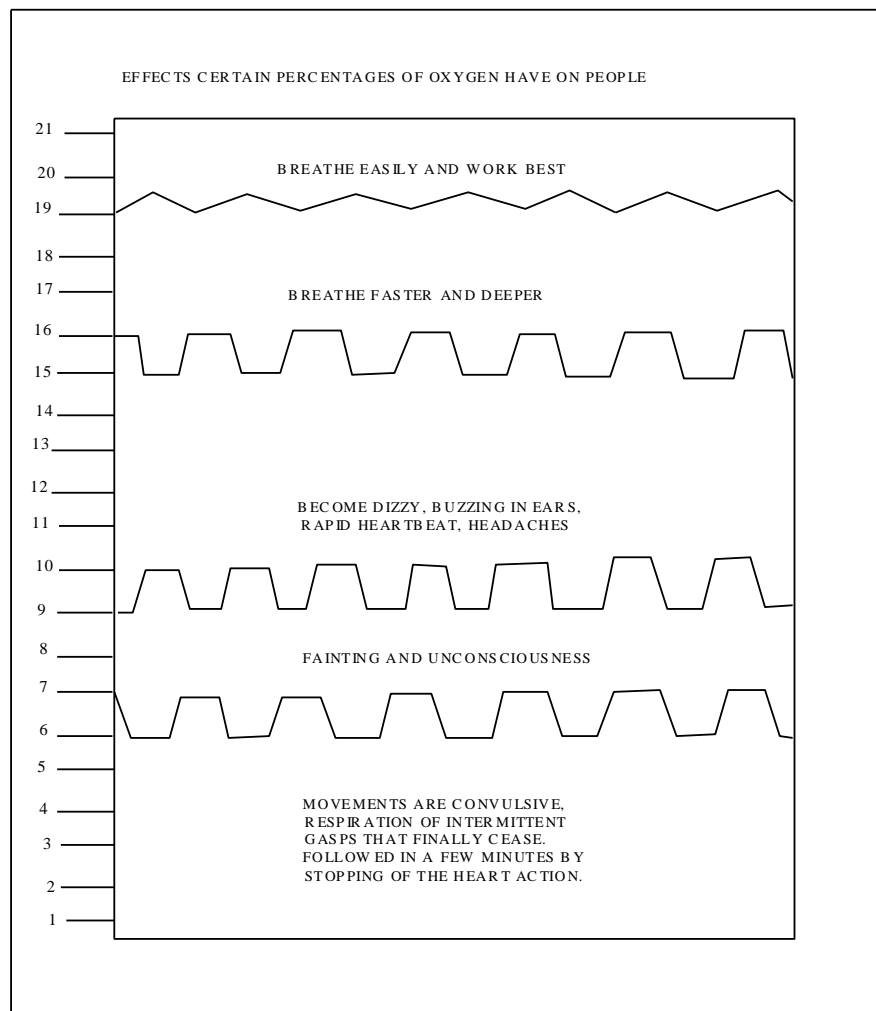


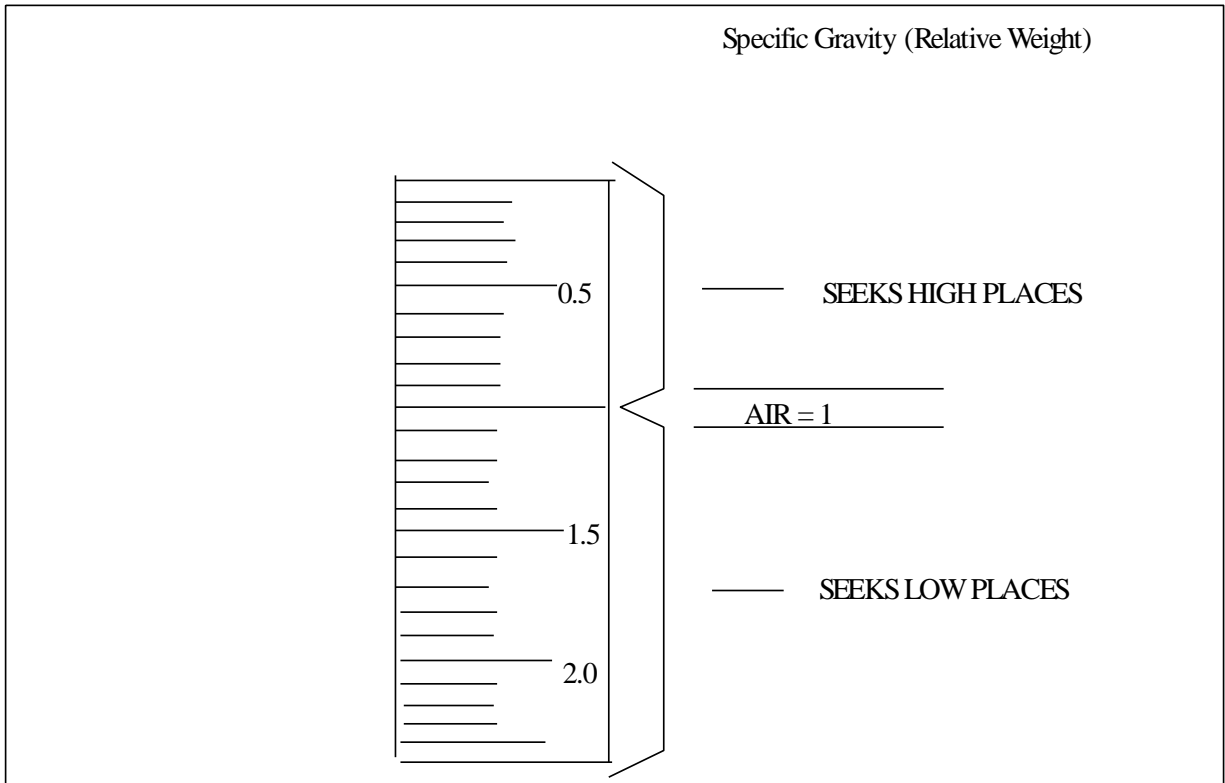
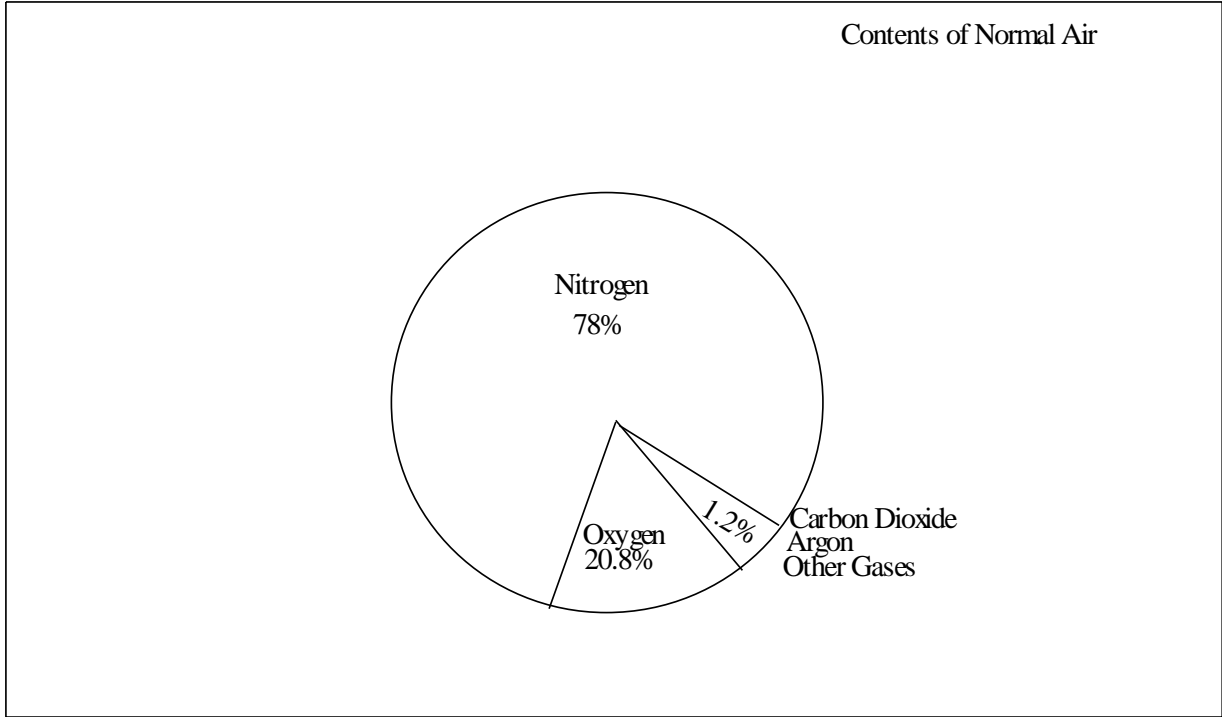
Pressure Decreases



EFFECTS OF TOXIC GAS DEPEND ON:

1. CONCENTRATION
2. TOXICITY
3. LENGTH OF EXPOSURE





B. TESTS FOR METHANE IN SURFACE INSTALLATIONS

Tests for methane in surface installations, enclosures or other facilities in which coal is handled or stored shall be conducted by a certified person using an approved device. These tests shall be made at least once each shift and immediately prior to any work in which welding, cutting, or open flame is used.

§45.1-161.256

C. TESTS FOR METHANE AND OXYGEN DEFICIENCY AT AUGER MINING OPERATIONS

1. Tests for methane and oxygen deficiency shall be made at the collar of the hole when an auger penetrates an abandoned or mined out area of an underground mine.

§ 45.1-161.290. A

2. A preshift and at least once during each coal producing shift, a certified person shall inspect the face of all highwalls to at least twenty-five feet on both sides of the auger operation. Also, frequent checks shall be made after heavy rainfall and during freezing/ thawing conditions.

§45.1-161.289 A. and B.

D. QUESTIONS FOR REVIEW

1. Q. What type of tests shall be made when an auger hole penetrates an abandoned or mined out area of an underground mine?

A. Tests for the presence of methane and oxygen deficiency.

§45.1-161.256

2. Q. What examinations shall be made during auger mining?

A. The face of highwalls for a distance of twenty-five feet in both directions shall be pre-shift examined and at least one examination during each coal-producing shift.

§45.1-161.289

3. Q. What precaution shall be taken by a Surface Foreman after a heavy rainfall or during the freezing-thawing season at an auger mining operation?

A. Frequent examinations for a distance of 25 feet in both directions shall be conducted to detect loose material, an unstable highwall or other unsafe condition.

§45.1-161.289

4. Q. What shall be the duty of Surface Foremen when a highwall with loose material exists within 25 feet from the auger?

A. The workers shall be removed and such hazard or unsafe condition shall be corrected before work is resumed.

§45.1-161.287

5. Q. Who is authorized to make on-shift examinations of a surface coal mine?

A. A certified Surface Foreman designated by the mine operator.

§45.1-161.256

6. Q. The pre-shift and on-shift examination results, conditions found and corrective action taken shall be recorded in what type book?

A. The daily record book in which information is recorded with ink or indelible pencil.

§45.1-161.257

7. Q. Who shall conduct on-shift examinations of work areas including pit, auger, thin seam, and highwall miner operations?

A. Surface Foreman.

§45.1-161.256 A

8. Q. Who shall conduct pre-shift examinations for certain hazardous conditions designated by the Chief?

- A. Surface Foreman.
§45.1-161.256 C
9. Q. Who shall conduct on-shift examinations of all mobile equipment?
- A. An authorized person.
§45.1-161.256 B
10. Q. Who shall conduct daily examinations at mine refuse piles where miners are working?
- A. An authorized person.
§45.1-224.A
11. Q. Who shall conduct weekly examinations of silt retaining dams?
- A. A qualified person designated by the operator.
§45.1-224.A
12. Q. How often shall methane examinations be conducted in surface installations, enclosures, or other facilities in which coal is handled or stored?
- A. Once each production shift.
§45.1-161.256 G
13. Q. Who shall conduct methane tests in surface installations, enclosures, or other facilities in which coal is handled or stored?
- A. An authorized person certified to make gas tests.
§45.1-161.256 G
14. Q. What test must be conducted before any activity involving welding, cutting, or open flame is to be conducted in surface installations where coal is stored?
- A. Methane.
§45.1-161.256 G

15. Q. How often shall electrical equipment and wiring be inspected for safe operating condition?

A. Once a month.

§45.1-161.256 H

16. Q. How often shall fire extinguishers be examined?

A. At least once every six months.

§45.1-161.256 I

17. Q. Who shall examine inactive areas of surface mines for hazardous conditions immediately before miners are permitted to enter such areas?

A. Surface Foreman.

§45.1-161.256 I

18. Q. Who shall inspect electric equipment and wiring?

A. Certified electrical repairman.

§45.1-161.288 A

19. Q. How often shall a certified electrical repairman inspect auger, highwall and thin team mining electric equipment and wiring to assure safe operation condition?

A. At least once each week.

§45.1-161.288 A

20. Q. How often shall a functional check on methane monitors on equipment be made?

A. Once each production shift.

§45.1-161.288 B

21. Q. How often shall methane monitors on electrical face equipment be calibrated?

A. Weekly.

§45.1-161.288 C

22. Q. Who shall inspect the face or highwalls before auguring operations begin?

A. A person certified as a Surface Foreman.

§45.1-161.289 A

23. Q. What distance shall the Surface Foreman examine the face of highwalls during periods of heavy rainfall or freezing/thawing during auguring operations?

A. Twenty-five (25) feet in both directions.

§45.1-161.289 B

24. Q. Who shall record hazardous conditions detected during an on-shift examination of auguring operations?

A. By the certified Surface Foreman performing the examination.

§45.1-161.257 A

25. Q. Where shall the actual methane readings taken during an on-shift examination be recorded?

A. In a mine on-shift examination record book.

§45.1-161.257 B

26. Q. Who shall maintain and sign the daily on-shift examinations record book?

A. The Surface Foreman that conducted the examinations.

§45.1-161.257 C

27. Q. Who shall record, read and sign the reports entered into the daily on-shift examinations record book?

A. The Surface Foreman shall record and sign. The mine operator or his agent shall read and countersign the record book, if different than the Surface Foreman.

§45.1-161.257

28. Q. What shall be done with natural gas pipelines on permitted surface mine areas?
- A. The gas pipelines shall be identified and conspicuously marked.
§45.1-161.256. E.
29. Q. When shall pre-shift examinations be conducted of the locations of gas pipelines?
- A. When active workings are approaching within 500 feet of such pipelines unless otherwise approved by the Chief.
§45.1-161.256.E.

REFERENCES

**Coal Mine Safety Laws of Virginia; Commonwealth of Virginia;
Department of Mines, Minerals and Energy**

**Code of Federal Regulations; Title 30 (30 CFR), Part 77; Office of
Federal Register National Archives and Records Administration**

MSHA's Surface Installation Manual, Coal Mine Entry Level Training

MSHA Miners Circular - #36R, U.S. Department of Labor

OSHA: Clear Cutting Safety Requirements and Recommendations

**MSHA: Compliance Assistance Guide for Tree Cutting On Mine
Property**