Part 33 Explosives Safety

Highlights

- Section 467 requires employers to prepare safe work procedures specific to the blasting activities. Safe work procedures for the handling of pyrotechnic and special effects devices and explosives must be based on the referenced National Fire Protection Association (NFPA) standards. (Section 8 of the *OHS Regulation* requires that the procedures be in writing and available to workers.)

- Section 503 refers to new and revised minimum-separation distance tables applicable to radiofrequency transmitters and explosives. The tables distinguish between fixed radiofrequency transmitters, such as television transmitter towers, and mobile transmitters, such as portable two-way radios and cellular telephones.

- Section 515 permits the pre-priming of charges during avalanche control activities. The priming of charges is normally restricted to blasting sites. The Canadian Avalanche Association has demonstrated that the pre-priming of explosive charges and their subsequent careful transport is a safe practice for avalanche control purposes.

- Section 516 presents requirements specific to oil well blasting and perforating.

- Section 466 prohibits the presence of burning materials in the vicinity of explosives. Section 517 recognizes that seismic drills operating in remote locations under cold conditions routinely using an open flame to thaw frozen water and water pipes required during drilling. The section therefore permits the use of an open flame heating device during seismic drilling if the listed conditions are met.

Requirements

Section 465 Application

The use of explosives at a mine site is subject to specific requirements presented in Part 36, Mining.

Section 466 Burning material

The 15 metre safe distance is intended to prevent explosives from being accidentally detonated.

Section 467 Safe work procedures

Subsection 467(1)

Employers are required to prepare safe work procedures specific to the employer's blasting activities. Section 8 of the *OHS Regulation* requires that the procedures be in writing and available to workers at the work site affected by them. Section 13 of the *OHS Regulation* requires the employer to make sure that workers affected by the procedures are familiar with them before work begins.

Where the procedures are held is dependent on the employer and the particular work situation. In some cases they are best held at a centralized location, at other times they may need to be at the work site.

Subsection 467(2)

This subsection references two National Fire Protection Association (NFPA) standards specific to pyrotechnic and special effects work. The NFPA standards are recognized within the industry as presenting "best practices" and are often referenced by local authorities such as fire departments when performance permits are requested.

NFPA Standard 1123, *Code for Fireworks Display*, applies to the construction, handling and use of fireworks intended solely for outdoor fireworks display. The standard includes requirements for special firework aerial shells and equipment, site selection and operation of the display. The Standard does not apply to the use of common (Class C) fireworks by the general public or to the use of pyrotechnics devices in the performing arts. The purpose of the Standard is to provide requirements for the reasonably safe conduct of outdoor fireworks displays.

NFPA Standard 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience*, applies to the use of pyrotechnics in the performing arts in conjunction with theatrical, musical or similar productions before a proximate audience (closer to pyrotechnics devices than permitted by NFPA Standard 1123), performers or support personnel. The Standard applies to any indoor or outdoor use of

pyrotechnics. The purpose of the Standard is to provide requirements for the reasonable protection of pyrotechnic operators, performers, support personnel, viewing proximate audiences, property and buildings where pyrotechnics are used indoors or outdoors.

Section 468 Blasters

Subsection 468(1)

The intent of the blaster's permit system is to set the minimum competency requirements for workers who use explosives at a work site. The OHS Code defines the handling of explosives to include "preparing, loading, firing, burning or destroying explosives or detonators".

Reflecting this definition and the requirements of this section, a worker engaged in the preparation, firing, burning or destruction of explosives is required to either hold a valid blaster's permit or be under the direct supervision of a person who holds a valid blaster's permit. The term "direct supervision" means

(a) the worker being supervised is under the personal and continuous visual supervision of the blaster – the two workers must be capable of interacting with one another on a one-on-one basis and must maintain visual contact with one another throughout the performance of the work for which direct supervision is required; and
(b) the two workers must be able to readily and clearly communicate with each other – in noisy or distracting circumstances, hand signals may be appropriate. These signals must be clearly understood by both workers.

The employer is responsible for making sure that these requirements are met and that blasters have a valid blaster's permit.

Two additional situations can arise in which a worker is not required to have a blaster's permit:

(1) a worker transporting explosives; and
(2) a worker designated by an employer who delivers explosives to, and/or collects unused explosives from, a blaster(s) at a work site.

The employer must ensure that the worker transporting or delivering/collecting the explosives is competent and trained to do the work safely. The worker must also meet all of the federal government's requirements under the *Dangerous Goods Transportation and Handling Act* and *Explosives Act* (Canada) when transporting explosives.

Subsection 468(2)

The employer is responsible for making sure that the blasting area — the area extending at least 50 metres in all directions from any place in which explosives are being prepared, fired, destroyed or in which armed charges are known or believed to exist — is under the direction and control of a blaster. A blaster has the knowledge, training and experience required to safely direct and control activities taking place in the area. The blaster must have a valid Blaster's permit.

Subsection 468(3)

At work sites where there is more than one blaster with a valid blaster's permit, the employer must designate one blaster to be in charge of all blasting operations. Well-defined control and management of the blasting area is critical to worker safety. Specific individuals must be designated to make decisions and be accountable for work practices and safety at the work site. To avoid problems related to communication and responsibility, one blaster must be designated as the "blaster-in-charge".

Subsection 468(4)

The blaster must have direction and control of the blasting area. All work involving blasting must be done according to the employer's written safe work procedures (see section 467) and current safety regulations.

The blaster and other workers are required to use the safeguards, safety appliances, personal protective equipment and other devices required by the OHS Code.

Section 469 Reporting incidents involving explosives

As required by section 18 of the *OHS Act*, serious injuries or accidents must be reported to Alberta Employment and Immigration. The employer must complete an accident investigation report that is then kept on file by the employer for a minimum period of two years.

The serious injuries and accidents that must be reported by law are those that
(a) result in death,
(b) cause a worker to be admitted to hospital for more than two days,
(c) involve an unplanned or uncontrolled explosion, fire or flood that causes a serious injury (or has the potential of causing a serious injury),
(d) involve the collapse or upset of a crane, derrick, or hoist, or

(e) involve the collapse or failure of any component of a building or structure necessary for the structural integrity of the building or structure.

The list of items in this subsection reflects the requirements of the *OHS Act*. The need for reports is limited to those events involving an unplanned or uncontrolled explosion or fire, whether or not any person was injured. This serves to eliminate the reporting of minor accidents such as misfired explosives or a worker slipping and tripping while carrying a box of explosives.

For more information


http://employment.alberta.ca/documents/WHS/WHS-PUB_li016.pdf
Reporting and Investigating Injuries and Incidents

Handling Explosives

Section 470 Canadian guidelines

To avoid unnecessary duplication of requirements among provincial and federal regulations, this section refers to federal guidelines and standards rather than restating their requirements. The referenced publications are available from:

Explosives Regulatory
Division
Natural Resources Canada
Unit 224, 755 Lake Bonavista
Drive SE
Calgary, AB T2J 0N3
Phone: (403) 292-4766

Explosives Regulatory
Division
Mineral and Metals Sector
Natural Resources Canada
Ottawa, Ontario K1A 0E4
Phone: (613) 995-8415
E-mail: canmet-erd@nrcan.gc.ca

The revised *Storage Standards for Industrial Explosives* as published by Natural Resources Canada came into force on May 31, 2001. The Standards update and supercede the *Revised 1982 Magazine Standards for Blasting Explosives and Detonators*.

The Explosives Regulatory Division (ERD) of Natural Resources Canada, in conjunction with the RCMP, has developed and adopted a redesign of the walk-in magazine door to ensure a higher degree of security. This new standard makes the laminated door mandatory for walk-in-type magazines and introduces many barriers to prevent a break-in. The new door concept referred to in this document

was adopted on all new walk-in magazines immediately upon introduction of the standard on May 31, 2001. For existing magazine installations, it is to be phased in over the next 5 to 10 years as a replacement, with particular emphasis in areas prone to break and enters (B&E) or attempted break-ins.

In the interest of security, ERD has, on the advice of the RCMP, moved from heavy-duty locks to high-security locking hardware and emphasized better key control for magazines. There will be no grandfathering on locking hardware and, thus, licensees will have from three to five years from May 31, 2001, to upgrade to the newer, higher security standards.

Recent ballistic threat assessment tests using readily available ammunition for hunting have resulted in upgrading the wall thickness, particularly for the new Type 4 magazine standards, from 5 centimetres (2 inches) to 7.6 centimetres (3 inches) for washed hard crushed gravel and to 15 centimetres (6 inches) for sand. In most cases, existing magazine wall construction will be grandfathered.

With the publication of this standard, Type 2, 3, 5 and 7 magazines will no longer be permitted as an option for new magazines built after May 31, 2001, due to inherent weaknesses and duplication in the case of Type 7. Existing magazines built to the above designs will need to be replaced with an appropriate magazine over the next 5 to 10 years depending on the risk as determined in consultation with the RCMP Bomb Data Centre and other police authorities.

Type 9 magazines, as known now, will be phased out over a five-year period and be replaced with an updated design with many similarities to a Type 4 magazine.

Type 11 magazine standards have been revised and use an ISO container commonly known as a “seacan”, which has been upgraded to include the newer door concept with ballistic materials in the walls. This bullet-resistant structure has many of the attributes of the former Type 5 magazine standard plus metal studs in the walls. Magazines built to this standard will have limited use as they are not considered an equivalent replacement for a Type 4 or 4S steel magazine. This standard has been upgraded to reflect the higher sensitivity of UN 1.1D classified explosives stored in northern regions, but may also be considered for use in other parts of Canada to meet particular circumstances.

Type 12 magazine standards have been reworded to allow more flexibility for novel designs related to particular circumstances.

ERD has taken a fresh approach to the electrical classification for magazines, particularly for interior lighting and recognizes the minimal hazards associated with finished packaged products. Along the same lines, heating guidelines have

been included as has the referencing of Electronic Intrusion Alarm Systems for Magazines (ERD Bulletin Number 45).

In the past, it has been customary for any welding shop to build a walk-in type magazine from the published magazine standards. With the publication of these revised standards, the intimate details of the door design will be controlled and issued to "approved" shops or facilities across Canada to maintain consistent quality of construction and to limit the design details to those who have a "need to know." As has been the case in the past, any welding shop will be able to construct the balance of the magazine if it so wishes.

Each magazine will now have a unique code composed of numbers/letters with a corresponding tag installed in the magazine and noted on the licence.

Section 471 Intermittent storage

Only magazines can be used to store explosives. Explosives removed from a magazine must be returned as quickly as possible if they are not used. Explosives cannot be left in any other location between periods of work because of the potential for them to be lost, stolen or accidentally detonated.

Section 472 Light sources in magazines

Artificial light sources such as flashlights, headlamps, vehicle headlights and lanterns must be of such a type, or constructed or positioned in such a way, that they eliminate the possibility of explosives contained in the magazine from being exposed to sparks, open flames or other sources of ignition. Some of these light sources might be designed and approved "for use with explosives". In other cases, the light sources may need to be positioned outside the magazine with their light shining into the magazine.

Section 473 Transporting explosives

Subsection 473(1)

The transportation of explosives is a federal matter. Alberta Employment and Immigration does not regulate the transportation of explosives.

Subsection 473(2)

Limiting the number of persons travelling in a vehicle that is transporting explosives and detonators reduces the number of persons at risk of serious injury in the event of an accidental detonation.

Subsection 473(3)

Electric detonators are safest to handle when their leg wires are twisted together and shunted or grounded. Doing so prevents accidental premature ignition. The wires are to remain shunted until the detonators are ready to be connected to the blasting circuit.

Subsection 473(4)

In the event of a fire, fire extinguishers are to be used to prevent the fire from reaching the explosives. Fire extinguishers are not intended to be used to fight a fire directly involving the explosives. Vehicles transporting less than 25 kilograms of explosives must be equipped with at least one fire extinguisher.

A vehicle transporting 25 to 2000 kilograms of explosives must be equipped with at least one 10 BC fire extinguisher (the federal *Explosives Act (Canada)* requires one 5 BC fire extinguisher). The increased rating for Alberta complements the new requirement for a fire extinguisher when transporting small quantities of explosives and reflects the greater quantity of explosives being transported. The requirement for two 10 BC fire extinguishers when transporting more than 2000 kg of explosives is consistent with the *Explosives Act (Canada).* The requirements for fire extinguishers appear in Schedule 10 of the OHS Code, shown below as Table 33.1.

Table 33.1 Fire extinguisher requirements
(appears as Schedule 10 in the OHS Code)

Quantity of explosive	Quantity and type of fire extinguisher required
< 25 kilograms	1 — 5 BC fire extinguisher required
25 kg to 2,000 kilograms	1 (minimum) — 10 BC fire extinguisher
> 2,000 kilograms	2 (minimum) — 10 BC fire extinguishers

Section 474 Oldest used first

Over time, some types of explosives can deteriorate and become less effective. To limit the likelihood of explosives being kept in storage for extended periods of time and being allowed to deteriorate, an "oldest first" — older explosives should be stacked in front of newer ones — practice must be followed. This ensures constant turnover of explosives that limits how long they are stored before being used.

Section 475 Deteriorated or damaged explosives

Deteriorated or damaged explosives must not be used in any blasting operation. Blasting operations may be ineffective with such explosives and damage may make the explosives unnecessarily dangerous during handling. Deteriorated or damaged explosives must be destroyed or disposed of safely by a blaster.

Section 476 Unused explosives

Unused explosives, fuse assemblies or detonators must be stored in accordance with the OHS Code. These products must be destroyed or disposed of according to the manufacturer's recommendations by a blaster having a valid blaster's permit.

Section 477 Appropriate quantities

The purchase and selection of charge sizes and the removal of appropriate quantities of explosives from the magazine should be based on the tasks being undertaken. This reduces the likelihood of larger charges being partitioned and excess explosives having to be returned to the magazine. This also eliminates unnecessary handling and reduces the possibility of an incident.

Section 478 Cutting or piercing

The requirements are intended to reduce the possibility of unintentional detonation caused by a spark created in the work area.

Section 479 Cartridge explosives

The outer cover of cartridge explosives provides a protective barrier and a means of preventing granular explosives from spilling. Both the employer and the worker are responsible for ensuring that safe practices are followed and outer covers are not removed.

Section 480 Tools

Crimping tools continue to be used in some explosives operations. Where this is the case, the employer must provide the tools and a safe location in which fuse cutting can be performed.

Section 481 Priming

Charges must be primed as close to the site of their detonation as possible. This reduces or eliminates unnecessary handling of a charge that has been primed, limiting the possibility of injury from unintended detonation. No more explosive than is required to perform the work should be removed from the magazine. This eliminates unnecessary handling and reduces the possibility of an incident.

To prevent the unintended detonation of stored explosives, charges must not be primed in any location where explosives are stored.

Primed charges must not be assembled in advance of the hole drilling operation. Only one charge must be prepared and loaded at a time prior to moving to the next hole.

Section 482 Length of safety fuse assemblies

This section requires safety fuse assemblies to be at least 1 metre long. Workers must not cut the fuse to a shorter length. Safety fuses must be of sufficient length to permit easy connection and allow enough time for the blaster to retreat to a safe location.

Section 483 Detonators

The timing, delay and blasting characteristics of detonators can vary. Requiring all detonators to be produced by the same manufacturer ensures performance consistency and effective blasting operations.

Section 484 Storms

An electrical or severe dust storm can develop sufficient electric energy in the air to initiate susceptible unshunted electric detonators. Both the employer and the blaster are responsible for suspending blasting operations during or upon the approach of such storms.

Section 485 Drilling location

The requirement is intended to prevent the detonation of explosives remaining in a hole.

Section 486 Bootleg

A bootleg is a portion of a drill hole or bore hole that has not been destroyed after detonation of an explosive charge. It may or may not contain explosives. Examination of the bootleg helps to determine if it contains explosives that could cause problems.

When a misfired explosive is discovered in a bootleg, it must be blasted to eliminate it from detonating unexpectedly at some future time.

Section 487 Size of drill hole

Excessive insertion force may cause unintended detonation of the explosive charge.

Section 488 Prohibition

Looking directly into a drill hole or borehole during loading operations is a dangerous practice. If an explosive detonates unexpectedly, some of the blast energy will be directed upwards, potentially injuring any person looking down into the hole.

Section 489 Unwinding detonator leg wires

To prevent misfires resulting from damaged leg wires, leg wires must be unraveled or unwound slowly.

Section 490 Static electricity

This requirement is intended to remind employers and blasters that care must be taken to minimize static build-up during the handling of explosives. Methods of limiting static build-up include static drain traps, work surfaces covered with static-free of static-dissipating materials and workers using static discharge wrist straps connected to ground.

Section 491 Tamping explosives

Loading or tamping poles and fittings must be made of non-sparking anti-static materials so they do not become a source of ignition.

Limiting tamping force reduces the likelihood of unintended detonation and damage to explosives during loading.

Section 492 Sequential firing

If charges are not fired properly in sequence, loaded holes can be cut off and result in misfired charges. This unnecessarily complicates the blasting operation and must be avoided.

Section 493 Detonation within 30 days

The time limit is intended to make sure that the charged holes are not forgotten and that the charges themselves remain effective and are not allowed to deteriorate.

Section 494 Detonator leg wires

These requirements reflect current best practices in the seismic industry. They are applicable to all circumstances where public access to exposed leg wires may be an issue.

Section 495 Testing detonators and circuits

Subsection 495(1)

Verifying proper operation of the detonator and complete firing circuit ensures that there are no broken wires or short circuits and the resistance of the circuit is compatible with the capacity of the power source. In the event of a misfire, section 509 requires that the worker wait for a period of 10 minutes before approaching the misfire. Doing so prevents the worker from being injured by a slow-to-fire electric detonator. Testing each detonator and its firing circuit detects suspect detonators and avoids the 10-minute waits associated with a misfire.

Subsection 495(2)

Standard ohmmeters or multimeters cannot be used for testing blasting circuits because they can introduce a test current capable of unintentionally and unexpectedly detonating the detonator under test. As written, this section does permit the use of alternate test instruments as long as they are "designed for use with detonators". Either the product's manufacturer or a professional engineer can confirm that a particular test instrument is appropriate for use with detonators.

Section 496 Damaged leads and wires

A damaged wire will not activate the charge because current is unable to pass through the wire to the charge. The result will be a misfire that could have been prevented.

Section 497 Connecting down lines to trunk cords

This requirement is intended to reduce the likelihood of unintended detonation and damage to down lines and trunk cords.

Section 498 Community protection

Protecting people and property from injury and damage is extremely important. This can be done by limiting explosive charges, using suitable protective devices in the blasting area to limit the movement of debris and restricting access to the blasting area. Both the employer and blaster are responsible for ensuring that appropriate precautions are taken.

Section 499 Safe distance

The minimum safe distance recognized as an industry-wide practice in seismic blasting operations is 30 metres. Unlike other industries, charge size and depth remain relatively constant, permitting the use of a single safe working distance.

In the case of operations involving pyrotechnics and special effects, the distances cited in the referenced NFPA standards must be followed.

Section 500 Stray electric currents

Stray electric currents can result from differences of potential (voltage) within a blasting area, inadequate grounding, or induced currents resulting from electromagnetic radiation. Both the employer and blaster must ensure that precautions are taken to prevent premature detonation caused by stray electric currents.

Section 501 Overhead power line

In an electric blasting system, electromagnetic radiation may introduce sufficient electric current to prematurely initiate detonation devices. The 60 metre distance is intended to limit this possibility.

Use of the term "overhead power line" makes this requirement very specific, eliminating the possibility of cable TV and telephone lines incorrectly restricting blasting operations.

Section 502 Above-ground charge

This requirement is intended to prevent injury and damage to persons and property.

Section 503 Radiofrequency transmitters

Subsection 503(1)

Table 2 of Schedule 10 presents minimum separation distances between explosives and fixed radiofrequency transmitters based on transmitter power. Table 3 presents minimum separation distances between explosives and mobile radiofrequency transmitters and cellular telephones. Both tables are based on information appearing in the *Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Commercial Electric Detonators (Safety Library Publication No. 20),* July 2001, published by the Institute of Makers of Explosives (www.ime.org).

Subsection 503(2)

Safety is best assured when detonators are shunted. Communications transmissions are permitted within the minimum separation distance limits specified by Table 2 or Table 3 of Schedule 10 as long as the detonator leg wires are shunted.

Subsections 503(3) and 503(4)

These requirements recognize that

(a) cellular telephones present a potential hazard as the radiofrequency energy they transmit may cause unexpected detonation of electric blasting detonators, and

(b) cellular telephones transmit signals at periodic intervals to their network, even when on one is speaking into the telephone. In contrast, portable two-way radios transmit only when the push-to-talk button is depressed.

Section 504 Length of fuse assembly

As required by section 482, a safety fuse assembly must be at least 1 metre long. It must also protrude from the borehole and be long enough to allow the blaster to reach a safe location after igniting the safety fuse.

Section 505 Blasting machine

Subsection 505(1) and 505(2)

Blasting machines have safety features that reduce the likelihood of unintentional detonation of explosives. Many blasting machines incorporate circuit test features that check the continuity of the blasting circuit to ensure that a successful detonation occurs. A battery or system of batteries is in general an unsafe alternative to a blasting machine and its use is prohibited for electric blasting.

Subsection 505(3)

While compact blasting machines are available for field use, batteries are far less expensive and their use for detonating unrecoverable explosives is permitted. Because charge sizes and hole depth are relatively uniform, seismic activities can rely on a minimum safe working distance when such activities are conducted. The exemption is restricted to the seismic industry.

Section 506 Shunting the firing line

When the controls of a blasting machine are set to their safe or unarmed position, the firing line to which it is connected is effectively shunted. This is functionally equivalent to the firing line being shunted by hand.

Section 507 Loaded hole

During seismic blasting and drilling operations, loaded holes are a natural consequence of preparing an area for detonation. Operationally, it is impractical to post clearly visible signs around loaded holes and is unnecessary when other safety conditions are met.

Section 508 Standards

No explanation required.

Section 509 Misfire waiting period

This requirement reflects current best practices. In some cases the manufacturer, based on the specific safety fuse assembly and delay detonators in use, recommends intervals that differ from the 10 and 30 minute intervals stated. In these cases, the manufacturer's recommendations must be followed.

Section 510 Withdrawing misfire

During oil well blasting and perforating operations, misfired perforating guns containing undetonated charges can be retrieved, repaired and returned to the hole.

Section 511 Destroying a misfire

Blasters are given the opportunity to assess local conditions to determine if blasting a misfire is both possible and practicable. If it is, then the blaster is directed as to where the second charge is to be placed.

Section 512 Abandoned charge

Subsection 512(1)

Charges must not be abandoned if they can be safely detonated. By extension, charges that cannot be safely detonated can be abandoned but the conditions stated in subsection (2) must be met.

Subsection 512(2)

Certain conditions must be met when a misfire or unfired charge is abandoned. Unless they can be safely removed or detonated, misfired explosives are left in the ground, their lead wires cut and buried beneath the surface and the location of the

misfire marked. Shunting of misfires is not necessary and the wires must be hidden below surface to prevent entanglement with people, animals and machinery.

The company that placed the misfire or unfired charge in the drill hole i.e. "the employer responsible for detonating the explosive charge", must keep a permanent record of its location and the charge.

Section 513 Removal of waste

Waste materials may have residues of explosives on them. Such residues are capable of detonating under the appropriate conditions, potentially injuring persons or damaging property. All waste materials must be removed from the blasting area prior to the area being abandoned.

Section 514 Loss or theft

Both the RCMP and the Chief Inspector of Explosives must be informed of suspicious incidents involving the loss or theft of explosives.

Section 515 Avalanche control

Subsection 515(1)

The special needs of avalanche control have resulted in the inclusion of separate, specific requirements in the OHS Code. Unless stated otherwise, all other requirements of the OHS Code also apply to avalanche control activities.

Subsections 515(2) and 515(3)

The Canadian Avalanche Association has demonstrated that the pre-priming of explosive charges and their subsequent careful transport is a safe practice for avalanche control purposes. Hand deployment of charges takes place from helicopters, with avalaunchers, during cornice blasting and along long and narrow ridgelines under conditions that can make on-site priming difficult and dangerous.

Subsection 515(4)

This requirement is intended to prevent primed charges and lighters from coming together and detonating unintentionally. It is a safety precaution required because the charges are pre-primed.

Subsection 515(5)

Because of the difficult circumstances and conditions under which avalanche control can take place (poor weather, from a helicopter, etc.), added safety precautions are required.

Section 516 Oil well blasting

Subsection 516(1)

No explanation required.

Subsection 516(2)

Alberta Employment and Immigration recognizes the *Perforating Industry Code of Practice* as a set of practices approved by a Director of Inspection.

The Petroleum Services Association of Canada (PSAC) publishes the Perforating Industry Code of Practice which defines safety standards applicable to the perforating industry. Compliance with the Code is a condition of the operating license issued by Natural Resources Canada (NRCan), Explosives Regulatory Division and applies to both PSAC and non-PSAC members. The Code is updated as necessary by provincial and federal representatives to promote industry best practices. Because of NRCan's reliance on the Code for regulatory purposes, NRCan has final approval of any revisions prior to publication. NRCan conducts annual, unannounced inspections of license holders, basing their inspection on the requirements of the Code.

The purpose of the PSAC Code of Practice is to inform personnel in the perforating sector of safety standards applicable to their business. The Code includes

(a) storage requirements – explosives in a magazine, loaded perforating guns and during transportation on motor vehicles,
(b) safe shop handling procedures – in loading and charging area,
(c) standard operating procedures – for the preparation, handling, loading and disposal of explosives,

(d) emergency procedures and reporting – of incidents involving explosives, vehicle breakdowns and the theft or loss of explosives, and
(e) fire fighting procedures – for shop or vehicle fires.

Copies of the Code of Practice can be purchased by contacting:

www.psac.ca/publications/169-perforating-industry-code-of-practice
PSAC Code of Practice

Subsections 516(3) and 516(4)

In oil well blasting and perforating, loaders handle stable charges when loading perforating guns at the workshop and do not handle detonators. As a result, this section exempts loaders from having to hold a valid blaster's permit. However, the employer continues to be responsible for ensuring that loaders are competent at their work and have access to a blaster whenever assistance is required. Access to the blaster can include telephone and portable two-way radio.

The task of "arming" perforating guns is restricted to blasters having a valid blaster's permit.

Subsection 516(5)

Tubing Conveyed Perforating (TCP) is a method of operating perforating guns that are run on pipe, including tubing strings, drill pipe and coiled tubing. TCP guns are fired by dropping a drop bar or can be pressure activated once in position.

Regardless of the initiation method, all detonation of explosives and the retrieval of a perforating firing system (including perforating gun or down hole tool) from the well bore must be conducted by a blaster with a valid Alberta blaster's permit.

For any TCP operation, the following procedures are expected to be observed by the employer.
(1) A licensed blaster, employed by the company providing the TCP service, must arm the TCP system.
(2) The dropping of a TCP Drop Bar must be performed by a licensed blaster employed by the company providing the TCP service.
(3) In the event of a suspected misfire or the lack of a positive indication of a mechanically activated TCP firing system, every effort must be made to retrieve the Drop Bar. A licensed blaster must be on site before and while the gun is removed from the well bore.
(4) In the event the Drop Bar cannot be successfully retrieved, then procedures developed by the manufacturer of the TCP system, the company providing the

TCP services and the operator of the well site must be followed before removing the tubing from the well bore.

Subsection 516(6)

During oil well perforation activities, perforating guns failing to detonate are removed from the drill hole, disassembled and the problem(s) corrected. During this time it may be impractical for a perforating gun to be connected to the blasting machine.

Subsection 516(7)

A blaster must ensure that if an armed device is at the surface, all electronic and power devices within 20 metres of the armed device must be turned off.

Section 517 Seismic blasting and drilling

Subsection 517(1)

The special needs of seismic blasting and drilling have been grouped together in this section. Unless stated otherwise, all other requirements of the OHS Code also apply to seismic blasting and drilling activities.

Subsections 517(2) and 517(3)

Seismic blasting operations require running water when holes are drilled in the ground. During winter operations, the only practical method of warming water tanks and valves on seismic drills in remote locations under severe climatic conditions is to use an open flame. Recognizing that under normal circumstances open flames are not permitted within 15 metres of explosives but that the practice is widely followed by industry, the listed conditions must be met so that the practice can be performed safely.