<u>Addendum</u> Explosives Safety Stakeholder Group Meeting Summary, December 4, 2019
Labor and Industries, Bellingham
1720 Ellis Street-Suite 200, Bellingham, WA, 9:00am-2:00pm

This document contains a summary of changes made after the meeting; with the assistance of department staff, management; and, stakeholders. The summary includes WAC Sections, proposed language, logic; and, contributors.

Part A Definitions, Purpose, Scope and Application

WAC 296-52-099 Definitions
No changes made.

Logic: Terminology changes were specific to chapter 296-52 WAC Safety standards for possession, handling, and use of explosives Part H Avalanche Control; and, not used by other industries. No general issues with application for other industries posed.

Part B Licensing

WAC 296-52-20060(1)(b)(i); added (ii)(iii)
Updated to read as follows:

WAC 296-52-20060 Reasons why applicants may be disqualified.

(1) Licenses will not be issued for the manufacture, retail sale or purchase of explosives to any applicant who is any of the following:
- *(a) Under twenty-one years of age;*
- *(b) Convicted in any court of:*
  - *(i) A crime punishable by imprisonment for a term exceeding one year;*
  - *(ii) Perjury, false swearing, or bomb threats*
  - *(iii) A crime involving a schedule I or II controlled substance, or any other drug or alcohol related offense, unless such other drug or alcohol related offense does not reflect a drug or alcohol dependency.*

Rationale: WAC updated to agree with Washington State Explosives Act; RCW 70.74.370-License revocation, nonrenewal, or suspension.

WAC 296-52-20090(10)
Added the clause “but before any transaction occurs involving the employee possessor.”
Rationale: To ensure clarity that the requirements to have a person vetted in advance of a purchase/delivery occurs.

WAC 296-52-23020(3)
Updated Aerial licensing requirements to either:

8 hours classroom and 4 supervised missions; or,
16 hours classroom and 3 supervised missions.

Rationale: Maintain training/education while reducing financial burden of flights. Changes discussed during the meeting of December 4, 2019 with attendees.

Part H Avalanche Control

WAC 296-52-82020

Moved (5)(d) to (9)(c)(iii)

Rationale: The type of construction referenced here is specific to containment rooms. Part (9) is about this subject. Better fit. Changes discussed during the meeting of December 4, 2019 with attendees.

Proposed changes following the meeting. To aid in the review, the entire section of WAC 296-52-84030, with proposed changes, is provided as clean text:

WAC 296-52-82020 Hand charge makeup room. (METHOD 2) This method is different from Method 1 primarily in that the fuse and cap assembly is installed in the explosive charge while inside a special makeup room.

(1) General

(a) The makeup room cannot be used for storage.

(b)When explosives are present in the makeup room, entry into the makeup room must be restricted to trained and authorized personnel.

(c) The access door(s) to the makeup room must be kept locked or bolted from the inside while employees are assembling explosives

(d) The entire makeup room must be kept clean, orderly, and free of burnable rubbish

(e) Brooms and other cleaning utensils must not have any spark-producing metal parts if used when explosives are present

(f) Sweepings and empty explosives containers must be disposed of as recommended by the explosives supplier

(g) Repair activities which utilize spark-producing tools must not be conducted on any part of the makeup room while explosives are present

(2) Storage of Explosives. Makeup rooms:

(a) Must not be used for the unattended storage of 1.1 explosives

(b) May contain a Type 3 storage magazine for one thousand or less blasting caps if the:

(i) Room meets all requirements of this chapter; and

(ii) Type 3 storage is constructed according to the requirements in WAC 296-52-6400 and licensed.

(3) Restrictions

(a) A sign stating the occupancy rules must be posted inside the makeup room where it is clearly legible upon entering the room. The sign must post the following rules:

(i) Occupancy must be restricted to specifically authorized personnel

(ii) Smoking, matches, flame- or spark-producing devices, tools or equipment must not be permitted in the room at any time when explosives or explosive components are present; and

(iii) Flammable fuels or compressed gases must not be permitted inside the room nor stored within fifty feet of the room

(b) The makeup room must be equipped with a portable fire extinguisher of at least 2A-20BC rating

(4) The assembly procedure must be as follows:

(a) Install caps on correct length fuses with an approved crimper tool before explosives are brought into the makeup room

(b) The cap and fuse assemblies must not be combined with explosives to form hand charges until just before the intended time of distribution

(c) Only nonsparking skewers must be used to punch holes in an explosives cartridge

(d) The fuse must be laced or taped in position after inserting the cap in the charge

(e) Each hand charge must be placed in an explosives box or avalanche control pack immediately after assembly is completed

(f) No spark-producing metal tools must be used to open explosives containers

(g) Fuse igniters must never be attached to a fuse or a hand charge until the hand charge is at the blast site and the control crew is fully prepared to ignite the charge

(5) Location

(a) The makeup room must be located in accordance with the American Quantity and Distance Separation Tables as adopted in chapter 70.74 RCW, Washington State Explosives Act and this chapter except under conditions as indicated in this section.

(b) This separation must apply only to human proximity to the makeup room and only at such time as there are explosives in the makeup room.

(c) When the makeup room does not contain explosives, the separation tables must not apply.

(d) Where locating the makeup room in accordance with the quantity and distance separation table is impractical because of bad weather accessibility, rough terrain, or space availability the facility must be located at the safest possible location within the

limitation of the area which is the most isolated from assembly areas and buildings that are inhabited with application of additional protection measures such as (not an all-inclusive list):

(i) Berming.

(ii) Locating natural obstructions or buildings that are not inhabited between the makeup room and assembly areas and buildings that are inhabited.

(iii) Concrete/ debris barrier

(6) Interior finish. The inside of all makeup rooms must be finished and equipped to the following minimum requirements:

(a) Construction must be fire resistant and nonsparking up to the top of the walls. Nails or screws must be countersunk, blind nailed, or covered.

(b) Lighting must be by N.E.C. explosion-proof rated fixtures and all wiring must be in sealed conduit.

(i) Control switches must be outside the makeup room.

(ii) No electrical outlet boxes are permissible inside the room.

(7) Heating units must be limited to:

(a) Forced air systems with the heating unit located outside the room.

(b) Steam systems of 15 psig or less.

(c) Hot water systems of 130°F or less.

(d) The radiant heating coils and piping for steam or hot water systems must be protected so that explosives cannot come into contact with them.

(e) Heating ducts must be installed so that the hot air does not discharge directly on explosives.

(f) The heating system used in a makeup room must have controls which prevent the ambient room temperature from exceeding 130°F.

(8) Ventilation.

(a) The makeup room must be equipped with a ventilation system capable of maintaining a minimum rate of three air exchanges per hour during all times when explosives are present in the room.

(b) Fans and controls must be located outside the makeup room and must be of a type approved for this service.

(c) The lighting circuit control must also activate the ventilation fan and the ventilation fan must be operated whenever personnel are in the room.

(d) Exhaust ventilation must be arranged to discharge into outside air, not into an enclosed structure.

(e) The floor or exterior walls may be constructed with duct openings for heating and ventilation purposes provided that:

(i) Each duct opening is not greater in volume than seventy-two square inches; and

(ii) The combined number of duct openings does not exceed three; and

(iii) Duct openings are located within twelve inches of the floor or ceiling; and

(iv) Exhaust duct opening are not located on the wall above the makeup workbench.

(9) A makeup room that must be located closer than specified in Part E may require full containment design to meet safety standards. These designs are made to either:

(a) Contain the blast of an unplanned detonation entirely within the structure; or

(b) Channel the blast away from populated areas in a direction which must remain off limits to all persons while there are explosives within the structure.

(c) Full containment designs meeting the following requirements will be authorized:

(i) The makeup room must be constructed in accordance with a registered professional engineer's approved design; and

(ii) The total amount of explosives in the room at any time must not exceed the design limit of the room; and

(iii) The walls of the room must be concrete unless specified otherwise by an engineer, and:

(A) Designed to withstand the explosion of the total amount of the referenced explosives; and

(B) Constructed in accordance with specifications designed and certified by a licensed engineer; or

(C) Constructed to the specifications of Department of the Army TM5-1300 "Structures to Resist the Effects of Accidental Explosions" designed to produce walls which will withstand explosion of the referenced quantity explosives

WAC 296-52-82020

Added description of containment room objectives to (9)(a).

Rationale: To clarify the reason for containment rooms beyond normal construction with barricading, and set the terms that must be satisfied as either a) full containment; or, b) channeled blast.

WAC 296-52-84030(2)(b)

- Changed from scripted conversation to an example of good conversation.
- Added requirement to document agreed upon terms and require practice with the whole crew.
- Separated misfire procedures from the conversation.
- Specified reporting misfires in the same way as normal avalanche control.

Rationale: To allow flexibility of operation while ensuring good communication. Discussed with three stakeholders who attended the meeting in December.

Proposed changes following the meeting. To aid in the review, the entire section of WAC 296-52-84030, with proposed changes, is provided as clean text:

WAC 296-52-84030 Aerial avalanche mitigation and control operations.

(1) Pre-Flight

(a) Only authorized personnel will be allowed in the aircraft staging and control area during all phases of the avalanche mitigation and control operation.

(b) A safety briefing will be conducted by the Avalanche Control Team to discuss all aspects of the planned avalanche mitigation and control operation. The briefing must include the following:

(i) Overall avalanche target areas.
(ii) Ground handling and loading procedures for personnel and explosives.
(iii) Types of associated hazardous materials and fuses.
(iv) Communication procedures.
(v) Current and forecasted weather conditions.
(vi) Handling and ignition procedures.
(vii) Placement and dispensing procedures.
(viii) Special hazards such as misfires.
(ix) Aircraft malfunctions.
(x) Emergency Procedures

(c) Prior to loading explosives an aerial and ground (where appropriate) reconnaissance must be conducted by the Avalanche Control Team or at a minimum, the Pilot and Blaster-in-Charge. The following should be observed:

(i) Any hazards to flight in the staging areas, take-off or landing areas, and enroute or drop zones, e.g. obstructions, wires, or loose debris.
(ii) Determine that approach, departure, and transition routes remain clear of all non-associated activities.
(iii) Avalanche chutes that are subject mitigation and control, and any that may be affected by such operations, should be assessed to ensure the primary area and any sympathetic release area will not cause undue hazard to persons or property.

(iv) *Emergency landing areas in the event of an aircraft emergency.*

(v) *Emergency landing areas in the event of a problem with the explosives.*

(vi) *Determine safe areas for the aircraft where the effects of the blast and the resulting avalanche release can be observed.*

(d) Loading of Explosives must be:

(i) Done under the direct supervision of the Pilot and Blaster-in-Charge with minimum personnel.

(ii) Loaded into the rear of the aircraft.

(iii) *Ammonium Nitrate & Fuel Oil (ANFO) mixture may be transported in original packaging.* ***NOTE: Identification labels should be utilized for all prepared charges. Labels should be consistent with hazardous material placards for shape and information, and should identify parcels as "Danger, Explosives".***

(iv) Fuse igniters must be kept in a separate location from the explosives and controlled by the Observer.

(v) Stored in a manner that emergency mass deployment (jettison) is possible.

(e) After Loading of Explosives

(i) During travel to target areas, additional reconnaissance special attention may be performed to assure the absence of personnel from the hazard areas, e.g. hikers, skiers, snowmobiles, road traffic, etc.

(ii) If necessary, personnel will be placed around the hazard areas as guards to assure that non-associated personnel do not inadvertently enter the area.

(2) During Flight

(a) Dispensing Explosives

(i) Must be accomplished from an altitude above ground level that is low enough to assure accurate placement of charges but high enough to avoid obstacles.

(ii) The cabin door from which explosives will be dispensed from should be a sliding door or it should be removed prior to avalanche control mitigation operations.

(iii)The Avalanche Control Team will consist of, and assume the following responsibilities;

A. Pilot:

1) Flies the aircraft and coordinates the flight path regard to speed, altitude and flight track with the Controller for placement of explosive charges; and

2) Is responsible for all safety of flight decisions.

B. Blaster in charge:

1) Is primarily responsible for safely igniting and dispensing the explosive charges; and

2) Communicates directly with the Pilot for all instructions involving igniting and dispensing the explosives; and

3) Communicates with the Pilot to receive permission to open and close the cabin door.

4) The blaster in charge may assume either/both blaster in charge or controller responsibilities; or, may delegate the role of controller.

5) *If dispensing explosives, must be tethered with self-belayed with an approved mountaineering sling and seat harness; which may be adjustable.*

C. *Observer:*
   1) *Typically, rides in the rear of the aircraft next to the Blaster-in-Charge, with the explosives on the opposite side of the Observer (away from Blaster-in-Charge); and*
   2) *Has a primary responsibility to maintain positive control of the explosive charges, fuse igniters, and handing assembled charges to the Blaster-in-Charge; and*
   3) *Monitors fuse ignition, and dispensing of each explosive charge; and*
   4) *Verbally accounts for any remaining unused charges to the Avalanche Control Team.*

D. *Controller (optional):*
   1) *Communicates with the other team members if and as needed; and*
   2) *Is responsible to document and record all avalanche mitigation and control operations; and*
   3) *Communicates an estimate timing of charge deployment, and fuse burn times.*

(b) Communication is essential during the aerial avalanche mitigation and control operations.

(i) A Voice Operated Exchange (VOX) radio arrangement should be used between the Pilot and the Avalanche Control Team.

(ii) Key terms and timing sequence of operations must be:
   (A) coordinated and agreed to prior to the start of flights; and
   (B) documented in writing; and
   (C) practiced

(iii) An example of a typical operation's communication follows:
   (A) Following reconnaissance of the avalanche hazard area, the Controller guides the Pilot into position and identify the target(s).
   (B) If the aircraft does not have the cabin door removed, the Blaster-in-Charge requests clearance from the Pilot to open and secure the sliding cabin door.
   (C) The Controller announces the number of charges planned in the upcoming pass to the Avalanche Control Team.
   (D) The Observer then passes an explosive charge, ready for ignition and deployment, to the Blaster-in-Charge.
   (E) The Controller makes a final visual inspection of the target area and calls out "READY".
   (F) The Blaster-in-Charge has the explosive charge secured, places the igniter on the fuse and announces "IGNITOR ON."
   (G) The Blaster-in-Charge pulls the cords to activate the fuse igniters, and when activated announces, "FUSE LIT". (The Observer confirms that the fuses are burning and that the remaining charges are not affected).

(H) The Blaster-in-Charge immediately dispenses the charge forward, out and away from the aircraft and then sounds off with "CLEAR" or "BOMBS AWAY."

(I) If both fuses of an explosive charge fail to ignite, "MISFIRE" is announced.

(c) Misfired charges are an immediate danger requiring the following procedures:

(i) No relight is attempted; and

(ii) If practical, the charge may be disarmed by cutting the Detonating Cord between the charge and the fuses, and the fuse/cord assembly jettisoned from the aircraft; or

(iii) The entire charge may be jettisoned with location noted.

(iv) If the misfire results in a dud, the location is recorded and marked for future retrieval or reporting as required by WAC 296-52-8500(2).

(v) If practical, and after at least 30 minutes has elapsed since the misfire was jettisoned and resulted in a dud, a second charge may be dispensed on top of the dud in an effort to detonate it in place.

(c) At the end of the aircraft's blasting run, the aircraft is flown to the designated safe area and the results are observed and recorded by the Avalanche Control Team.

(d) A record must be kept off all misfires that resulted in duds as required by WAC 296-52-8500.

(e) The Blaster-in-Charge will be responsible for notifying the Department of Labor and Industries and the Bureau of Alcohol, Tobacco, and Firearms, within 24 hours as required by WAC 296-62-8500(2)(c).

(f) In the event of a malfunction with the explosive components or the aircraft, and at the discretion of the blaster-in-charge or the Pilot discretion respectively, the Blaster-in-Charge and Observer will jettison all remaining explosives and follow the procedures for reporting to the department listed above.

(g) These procedures are repeated until a reload is necessary or the avalanche hazard reduction has been accomplished.

(3) Post Flight

(a) Unused explosives are disassembled and returned to the magazine(s).

(b) The Avalanche Control Team will conduct a post flight briefing to discuss:

(i) The conduct and success of the mission with the customer; and

(ii) Any safety improvements that may be helpful for future missions.

(c) The mission must be fully documented and inventories confirmed.

WAC 296-52-85010(1)(e)(v)

Added clarification that numbers must be checked during weekends also.

Rationale: Add clarity, improve safety.

WAC 296-52-85010(2)

Added reporting language and phone number on sign example.

Rationale: Add clarity, improve safety.