PORTLAND FIRE & RESCUE

MAY 27, 2020

FIR 2.14 - USE OF EXPLOSIVES WITHIN THE CITY OF PORTLAND

I. SCOPE

A. This policy is established June 5, 2007.

B. The purpose of the policy is to provide guidelines and permit requirements for the transportation and use of explosives within the City of Portland.

C. This policy applies to all structures and areas where Portland Fire & Rescue (PF&R) has authority.

D. In 2001, the City Engineer transferred the permitting of the use of explosives to Portland Fire & Rescue, Fire Marshal's Office (FMO).

II. SPECIFIC

A. References

1. 2016 Portland Fire Code (PFC)
2. National Fire Protection Association (NFPA) 495, 2001 edition
3. NFPA 1124, 2003 edition
4. NFPA 1142, 2001 edition
5. Portland City Code (PCC) Titles 19 and 31
6. Oregon Revised Statute (ORS) 480.010-480.095
7. Oregon Administrative Rule (OAR) 837-090-1015
8. PF&R Application for Permit to Transport and Use Explosives
9. PF&R Revocable Permit for the Transportation and Use of Explosives
10. PF&R Permit Cover Letter

B. Definitions

1. The definitions set forth in the references noted above are adopted by reference.
2. **Storage:** secure holding of explosives for an extended period of time, generally overnight or longer.

III. GUIDANCE

A. General

This policy is not intended to limit or require a permit for the transportation and use of explosive materials by federal, state, and local law enforcement and fire agencies acting in an official capacity.

Whenever any conflict exists between definitions in referenced codes, the most restrictive definition shall apply. Whenever any conflict exists between the substantive provisions of this policy and those of the above-referenced codes, the most restrictive provision shall apply.

B. Permit Required

1. Except as otherwise provided herein, all blasting in this jurisdiction requires a permit to be issued from the Portland FMO. Permits may also be required from other City Bureaus. Sign-off by all authorities shall be completed prior to a permit being issued. The Bureaus include but are not limited to: Environmental Services, Water Works, Portland Police, and the City Traffic Engineer's Office.

2. No company or individual shall be in possession of explosive materials, or conduct an operation or activity requiring the use of explosive materials, or perform, order, or supervise the loading and firing of explosive materials without a current and valid blasting permit issued by the Fire Marshal's Office.

3. Explosive materials shall not be transported, sold, given, delivered, or transferred to anyone in this jurisdiction not in possession of a valid permit.

4. A blasting permit is required for every individual project requiring blasting.

5. A permit issued under this policy to any person, company or corporation is non-transferable to any other person, company or corporation.

6. Compliance with all federal, state, county, and city laws and regulations applicable to obtaining, owning, transporting, storing, handling, and using explosive materials shall be required and shall be a condition of all blasting permits issued by the FMO.

C. **Application**

Information required before a permit can be issued includes:

1. Completed FMO Explosives Permit application form specifying:
   a. Name, address, and phone number(s) of the person, company or corporation applying for the permit.
   b. Name, address, and phone number(s) of the blaster-in-charge who will actually supervise the blasting.
2. Copy of current and valid Certificate of Possession of Explosives issued by the State of Oregon.
3. Copy of scaled site plan, showing distances to all improved properties within 200 feet.
4. Copy of Transportation Plan for bringing explosives to the site.
5. Copy of Traffic Control Plan.
6. Copy of Blasting Plan.
7. Copy of the Pre-Blast Notification Letter to include addresses of adjacent property/homeowners that will be notified of the blasting, consistent with the Blasting Plan.
8. Copy of the certificate of liability insurance.
9. Copy of the Plans for Pre-Blast inspections for improvements within 200 feet of blast area. This is to include a list of all addresses and names of those offered pre-blast surveys consistent with the blasting plans.
10. Copy of Pre-Blast Notification Letter to be sent to adjacent properties.
11. Plans for Seismic Monitoring throughout the blasting.
12. Affidavit or Resume of blasting experience and training for both General Contractor and Blaster in Charge.

D. **Issuance**

1. Permit issuance is subject to an on-site inspection and verification by the FMO.

2. The Permitee agrees to pay an independent blasting consulting company, approved by the FMO, directly for services rendered as required on behalf of the FMO. The primary use of this consultant is to verify that the submitted plan is workable.

3. All blasting shall occur under the direct supervision of the indicated blaster-in-charge and in accordance with the blasting plan. No deviations from the blasting plan may occur without authorization from this office.

4. Blasting shall occur only during daylight hours but may not commence prior to 7:00 am and shall be completed within an hour prior to sun down. Any exceptions must be approved by the FMO prior to blasting.

5. Permit applications shall be submitted not less than two weeks prior to scheduled blasting. Applications submitted less than two weeks prior shall be subject to double the normal permit fee as noted in PCC Title 31.

6. Blasting shall not be allowed without a permit. Failure to comply will result in being cited to appear before the Code Hearings Officer.

E. **Revocation**

The Fire Marshal or the Fire Marshal's designee shall have the power to revoke any permit issued under the provisions of the policy for failure to comply with any of the provisions of this policy, or for any other reasonable cause. Examples:

1. Blasting where fly rock is propelled from the blast area by the force of the explosion.
2. Where ground vibration exceeds limits or damage is caused to adjacent structures.
3. Where air blast exceeds set limits or causes damage to surrounding structures.

F. **Appeal of Denial or Revocation**

Any person, company, or corporation who makes application for a permit to blast under the terms of this policy and whose application is denied by the Fire Marshal, or whose permit is suspended or revoked by the Fire Marshal or the Fire Marshal's designee under the terms of this policy may, within ten (10) days thereafter, file notice of appeal to the FMO. The appeal hearing will be conducted as required in PCC Title 31.10.080.

G. **Regulations**

1. **Transportation Plan:** A plan that addresses the transportation of explosive materials within the City must be included with the application for a blasting permit. The transportation plan must detail the following information:
   a. Route used for deliveries and returns
   b. Hours of transportation
   c. Maximum quantities of explosives being transported
   d. Types of vehicles being used must be in compliance with federal and state transportation regulations for motor transport of explosive materials.

2. **Storage of Explosive Materials:** No storage shall be permitted inside the city limits at any time.
   a. Blast holes loaded with explosives are to be shot on the day that they are loaded.
   b. Vehicles carrying explosives shall be staffed at all times.
   c. All unused explosives shall be returned to the supplier's magazine after the blasting has been completed for the day.
   d. The required method of handling explosives in this jurisdiction is as follows:
      i. Delivery;
      ii. Standby during loading;
      iii. Return of all unused explosive materials not used in that day's blasting.

3. **Blasting Plan:** A blasting plan for each discrete project requiring the use of explosives shall be submitted to and approved by the Fire Marshal or his designee prior to the issuance of a blasting permit.

   The plan shall be accompanied by additional documentation (e.g. maps, site plans and excavation drawings) in order to detail the proposed blasting operation. This plan shall include:

   a. The location where the blasting is to occur
   b. The approximate total volume of material to be blasted
   c. The incremental volumes, per blast, of material to be blasted
   d. The types and packaging of explosive materials to be used
   e. The drill hole diameters, depth, patterns, sub-drilling depths and drill hole orientations to be used
   f. The maximum weight of explosives to be detonated within any 8 milliseconds or less time increment
   g. The initiation system, the incremental delay times and the location of the primers in the explosive column
   h. The stemming depths and stemming material for the various estimated depths of drill hole to be blasted
   i. The approximate powder factors anticipated
   j. The fly rock control procedures and equipment, if any, to be used
   k. The maximum number of blasts to be made in any one day
   l. The dust control, during drilling procedures to be used and equipment, if any, to be used
   m. The blast warning sound system and equipment to be used
   n. The scheduled start date and finish date of blasting operations
   o. The Shot Report (see III. G. 10 of this policy) shall record the actual weight detonated for each 8-milliseconds or less detonation
   p. The Shot Report form used shall document all pertinent blast parameters and blast outcomes

4. **Traffic Control Plan:** A traffic control plan acceptable to the City detailing signing, flagging, temporary road closures and detour routes for blasting operations must be filed and a permit obtained from the City Traffic Engineer's Office prior to the issuance of a blasting permit. If any road closures are proposed, the traffic control plan must account for school bus schedules and shall not delay school buses on regularly scheduled routes.

   NOTE: A separate permit may be required from the City Traffic Engineer's Office.

5. **Pre-Blast Notification Plan:** A plan outlining a program of pre-blast public notifications, structural inspections and blast effect monitoring within a specified distance of the blasting is required prior to the issuance of a blasting permit.

a. **Distances:** The distances from the blasting within which the pre-blast public notification, pre-blast structural inspection, and blast effect monitoring are required shall be determined by the scaled distance formulas set forth in this policy. No blasting will be permitted until the notification and inspection requirements are completed.
   i. Distances from the blast within which notification of all occupied structures is required: $Da=90\sqrt{w}$
   ii. Distance from the blast within which inspection of all occupied structures is required: $Db=75\sqrt{w}$
   iii. Distance from the blast within which monitoring of selected structures is required: $Dc=60\sqrt{w}$
   iv. In the above formulas Da, Db, and Dc are the actual distances in feet from the closest point in the blast. $\sqrt{w}$ is the square root of the maximum weight of the explosives in pounds detonated with a minimum 8-millisecond from another detonation event.

b. **Pre-Blast Notification Letter**: The pre-blast notification shall consist of a letter advising all residential and commercial properties within a specified distance of the blasts (see V. A. 1. page 4) of the character and intent of the blasting program, its anticipated impact on local residents, the proposed duration of blasting activities, and shall provide telephone numbers for public contact. Distribution of this notification shall be made a minimum of seven (7) calendar days prior to the start of blasting.

c. **Pre-Blast Inspection:** A pre-blast inspection of local properties shall be offered to all residential and commercial properties within the specified distance of the blasting (see V. A. 2. page 4) at no cost to the properties and shall be done by a qualified third party who is not an employee of the contractor. A copy of the individual inspection reports and a log of all photos taken are to be provided to the FMO.

   Where inspections are disallowed by the occupant or not possible for other reasons, a certified letter shall be sent to the occupant/owner at the unsurveyed address advising them of their right to a pre-blast inspection and the possible consequences of denying an inspection. The pre-blast inspection program for residences within the specified distance shall be completed two (2) days prior to the start of blasting and the FMO notified by phone or in writing.

d. **Monitoring:** All blasts are to be monitored using blast-monitoring equipment designed for the purpose and carrying a certificate of calibration dated within the last twelve months. The blast monitors shall record peak particle velocity and frequency in three orthogonal directions and the air over-pressure in dBL. For shots in which the weight of explosive detonated per 8-millisecond time increment is less than 10 pounds, 1 blast monitor is required. When 10 or more pounds is detonated per 8-millisecond time interval, 2 blast monitors are required. All blast-monitoring records are to be signed and submitted to the FMO within 24 hours of each blast.

6. **Blasting Plan Compliance Inspections:** Blast plan compliance inspections are required for the first two blasts for any blaster new to this jurisdiction. Additional blasting inspections may be required of any blaster who is unable to comply with the approved blasting plan or control the extraneous effects of blasting such as flyrock, noise/air blast, and ground vibration. If more than two blasting inspections are required, an additional fee shall be charged based on an hourly rate of $100 per hour, minimum charge -1 hour or as specified in Title 31.

7. **Maximum Peak Particle Velocity:** The maximum peak particle velocity in any seismic trace at the dominant frequency to be allowed on any residential, business, or public structure designed for human occupancy is to be determined by the chart in Attachment 1. The referenced chart is **Figure B-1** taken from the US Department of the Interior Blasting Guidance Manual 8507.

8. **Air Blast:** The maximum air blast impulse overpressure caused by blasting permitted at the closest residential, business or public structure designed for human occupancy is not to exceed the limits promulgated by US Bureau of Mines (USBM) Standard RI 8485.

   Note: The publication(s) referred to or incorporated by reference in this policy are available from the FMO.

9. **Utilities:** Whenever blasting is being conducted in close proximity to or under existing utilities, the utility owner shall be notified a minimum of 48 hours in advance of blasting.

10. **Shot Report:** A signed shot report on a form approved by the Fire Marshal or his designee is to be filed with the FMO within 24 hours of making the blast. The report shall include the following blast information:
    a. Date, time and location of the shot;
    b. Number of drill holes;
    c. Maximum, minimum and average drill hole depth;
    d. Drill hole diameter;
    e. Sub-drill depth;
    f. Total pounds of each type of explosive used;
    g. A drill hole section schematic showing the loading of a typical hole;
    h. Amount and type of stemming;
    i. Schematic showing the drill hole pattern;
    j. Initiation delay sequence;
    k. Maximum pounds of explosives detonated in any 8-millisecond time interval;
    l. Type and size of any flyrock protection devices used, if any;
    m. Comments regarding the outcome of the blast.

11. **Required Notification:** Notification of the FMO shall be as follows:
    a. Any blasting accident: **IMMEDIATELY** by calling **911**.
    b. Any incident, damage claim or neighbor annoyance report brought to the permittees attention: **Immediately by calling 503-823-3333 and requesting contact with a Fire Investigator.**

AJ Jackson, Fire Marshal
Portland Fire & Rescue

Prepared By:	S. White
Effective Date:	December 19, 2006
Reviewed By:	
Review Date:	
Revised By:	D. Harrison
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Attachment:

1. Alternative Blasting Level Criteria (Appendix B, Figure B-1, US Department of the Interior Blasting Guidance Manual 8507)

ALTERNATIVE BLASTING LEVEL CRITERIA

(Appendix B, Replicated from US Department of the Interior Blasting Guidance Manual 8507)

Safe blasting vibration criteria were developed for residential structures, having two frequency ranges and a sharp discontinuity at 40 Hz (table 13). There are blasts that represent an intermediate frequency case, being higher than the structure resonances (4-12 Hz) and lower than 40 Hz. The criteria of table 13 apply equally to a 35-Hz and a 10-Hz ground vibration, although the responses and damage potentials are very much different.

Using both the measured structure amplifications (fig. 39) and damage summaries (figs. 52 and 54), a smoother set of criteria was developed. These criteria have more severe measuring requirements, involving both displacement and velocity (fig. B-1).