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## Commentary

**Title:** Display Fireworks Shows

**Issued:** June 2005

### Scope

This document is intended to help the local *authority having jurisdiction*<sup>1</sup> (AHJ) understand the important role they play in ensuring outdoor display fireworks shows are presented safely and in accordance with the *National Fire Code*<sup>2</sup> (NFC). The information contained in this Commentary will be most helpful to fire authorities in communities with no established procedures or policies for the approval of display fireworks events. Suggested safety checklists are included in Appendix A.

### Introduction

Display fireworks are explosives. Black powder (sometimes called gun powder) is the primary component of all display fireworks. Other agents, like sulphur or magnesium are added to produce colour and visual effects. Many of the precautions taken at a blasting site, such as limiting the use of 2-way radios and protecting the explosives from moisture, must also be taken when working with fireworks. Display fireworks are not available for sale to the public. Only persons who have met Natural Resources Canada regulations may purchase, prepare and present display fireworks. Local fire authorities are responsible for approving proposed events and ensuring public safety.

Article 5.1.1.3 – *Display Fireworks* of the NFC requires that the handling and discharge of display fireworks must be carried out following the regulations in the *Fireworks Manual* published by the Explosives Regulatory Division (ERD) of Natural Resources Canada. Section 2.5 – *Obtaining Event Approval* of the *Manual* requires organizers get approval from the local authority having jurisdiction before an event involving a display fireworks show may go ahead.

In Saskatchewan the AHJ does not require any special training or qualifications to evaluate or approve applications for a display fireworks event. However, there is free training available from Natural Resources Canada that gives local fire authorities a clear understanding of the safe handling, preparation and use of these explosives, as well as important information about public safety. Visit the Natural Resources web site for more information:

[www.nrcan.gc.ca/mms/explosif](http://www.nrcan.gc.ca/mms/explosif).

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<sup>1</sup> *Authority having jurisdiction (AHJ)* means the municipal authority responsible for enforcement of fire safety regulations and/or fire suppression response. In communities with a Fire Department the Fire Chief is delegated to act as the *AHJ*. In communities with no Fire Department the Administrator most often assumes the duties of the local authority having jurisdiction.

<sup>2</sup> The National Fire Code has been adopted as the primary set of fire code regulations and has the force of legislation in Saskatchewan.

## Issues

There are several key issues local fire authorities must consider before giving approval for a display fireworks show. These include;

- qualifications of the people preparing and presenting the show,
- location of the proposed event,
- permission from the owner of the event site and from owners of any adjacent property where debris from the show or unexploded fireworks may fall,
- ability of the sponsoring individual, group or organization to provide site safety and control and
- details of insurance and liability coverage.

## Qualifications and Certification

Natural Resources Canada issues three categories of certification for people working with display fireworks. The first classification is *Apprentice*. These people have successfully completed a course given by ERD. They may only work under the direction of a *Fireworks Supervisor – Level 1 or 2*. Level 1 Supervisors are authorized to purchase and use most types of display fireworks when set up at conventional sites - like sports fields or pastures. Level 2 Supervisors may purchase and use a broader range of specialized display fireworks and may set up shows in unconventional locations such as bridges, roof tops or on barges. Apprentices and Fireworks Supervisors carry identification cards issued by Natural Resources Canada. The cards have a photograph of bearer, their level of certification and the date their certification expires. Supervisors and Apprentices must produce their identification cards at the request of the AHJ.

Each display fireworks event has one Lead Fireworks Supervisor. This person is responsible for making application to the AHJ, providing all necessary documentation and assuming the liabilities associated with the handling, placement and discharge of the fireworks. The Lead Supervisor is also the contact person for local fire authorities.

## Event Locations

Display fireworks are divided into three categories; Ground Level, Low Level and High Level. A fireworks display site must be set up to maintain minimum distances from each type of fireworks to spectators, structures and vehicles. The mandated exclusion zones and distances usually mean an area of about 300m x 300m is required. This area is closed to all spectators (see the diagram in Appendix B). Only the Fireworks Supervisor and qualified crew members are allowed in this area during and after the show. The AHJ is permitted to inspect the display site during set-up but they are not allowed to remain during the show or during the fireworks cleanup period after the show. Event sponsors and members of the media may visit the display site before a show. Only 3 visitors are allowed at any one time and they must be continually accompanied by a Fireworks Supervisor or qualified crew member.

The Lead Fireworks Supervisor will provide a *Site Diagram*<sup>3</sup> as part of their Application for Event Approval. Local fire authorities should arrange to inspect the site with the Lead Supervisor to identify any special fire and life safety risks before approval is given.

A display fireworks show may not continue if winds exceed 45 km/hour. Some display fireworks will achieve a height of 150m (450ft) or more when fired. Burning debris and unexploded fireworks can fall a significant distance from the display site, particularly as winds approach the 45 km/hr maximum. Properties down-range and down-wind from the display site should be inspected in advance and any potential fire hazards noted. Depending on weather conditions, fuel loads and the nature of the identified hazards deploying a fire watch may be advisable.

#### Permission from Property Owners

It is the responsibility of the Lead Fireworks Supervisor to get written permission from not only the owner of the property where the event will be staged but from owners of adjacent properties as well. Local fire authorities may want to contact the owners to ensure they understand the risks of a display fireworks show and to identify any special fire hazards on their properties. When the fireworks event is to be staged on municipal property the Lead Fireworks Supervisor will require written permission for use of the site, even if the event is sponsored by the municipality. Copies of all the documentation submitted to local fire authorities for event approval (along with the written approval of the AHJ) also go to Natural Resources Canada for approval. That approval is necessary before the Lead Supervisor can purchase the fireworks required for the show.

#### Site Safety

As part of the application for event approval a Lead Fireworks Supervisor must provide details of how site security and safety will be maintained. A display fireworks show needs large open areas. Spectators must be kept out of the launching area and the fireworks fall-out zone. In most cases the sponsoring organization provides the site security and crowd control. Local fire authorities should contact the sponsor well before the show to review security arrangements. Not all display fireworks shows are public events. Businesses and private individuals sometimes sponsor a show. Site security is important even at these private displays. Private fireworks shows may attract the public. Security arrangements must be in place to ensure the safety of both invited and uninvited spectators.

Part of the responsibility of the Lead Fireworks Supervisor is providing for both medical and fire emergencies. Emergency Medical Services and Fire Departments usually standby at display fireworks events. Emergency vehicles and personnel should stage at

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<sup>3</sup> An example of a Typical Fireworks Display Site Plan is included in Appendix B.

least 100 meters<sup>4</sup> up-wind and up-range from the launching area. A clear access route must be kept open to allow for response of additional emergency crews and vehicles should they be required.

The Lead Fireworks Supervisor should call a meeting of all the agencies and organizations responsible for site security and safety. The Supervisor will explain the set-up of the display site and procedures to be followed before, during and after the show. The meeting is an opportunity to work out joint response strategies, staging locations, communications procedures and crew assignments.

## Insurance and Liability

While most display fireworks events go off without a hitch, there is still the very real potential for personal injury, unexpected explosions and fire. The Lead Fireworks Supervisor must provide written proof that a minimum of \$1,000,000 of liability insurance is in place for the event. The AHJ may require more than the \$1 million minimum coverage, based on an evaluation of the potential risks for injury and damage. In some cases the sponsoring organization may arrange for insurance coverage. Written proof of the coverage is still required.

## Role of the Local Authority Having Jurisdiction

Local fire authorities should not become involved in organizing a display fireworks event. It is up to the sponsoring organization and the Lead Fireworks Supervisor to arrange all the required permissions and documentation. Of course, as with any fire and life safety issue, local fire authorities may advise and assist the sponsor and Lead Supervisor in fire and public safety matters. However, if the local authority becomes an active participant in organizing an event, they create a conflict of interest. When the AHJ helps put on a show they are, in fact, issuing approvals of their own work. This creates significant liability issues as well as compromising the credibility of the fire department.

Local authorities should ensure a fireworks display site is set up and secured according to the approved plans submitted by the Lead Supervisor. Most local fire authorities do not have the training or experience to evaluate the equipment and techniques used by the Supervisor and crew in setting up a display fireworks event. Set-up of the fireworks launching site is best left to the Lead Supervisor. Maintaining safe distances and exclusions zones around the launching area is the responsibility of the sponsoring organization and the security personnel.

Based on significant fire and life safety concerns, the AHJ may cancel or stop a display fireworks event at any time. If local fire authorities do cancel or stop a show they can expect a

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<sup>4</sup> Exercise caution when using 2-way radios on the event site. Most fire department radios may be used safely outside the 100 meter exclusion zone around the fireworks launching area. Consult with the Lead Fireworks Supervisor about the safe use of radios before, during and after the event.

strong negative response from the sponsoring organization as well as spectators. As part of the pre-event safety meeting fire authorities should detail under what conditions they will order a show cancelled or stopped.

Minor safety concerns can usually be addressed by consulting with the Lead Fireworks Supervisor and the sponsoring organization. These issues are best dealt with during the approval process or at the pre-event safety meeting. Fire officials on-site during the fireworks event should have an established means of communication with the Lead Fireworks Supervisor in order to address any safety concerns that come up during the show.

### **On-Site and Emergency Operations**

Only the Lead Fireworks Supervisor and his/her crew may be in the fireworks launching area during a show and for at least 30 minutes after the show. During this period equipment, detonating systems and any unexploded/misfired display fireworks are left undisturbed. The Lead Fireworks Supervisor may restrict entry to the launch area beyond 30 minutes, until the launch area clean-up is finished. The fireworks crew is responsible for an inspection of the launch area and areas down-range and down-wind the morning following the show. When the Lead Supervisor is satisfied these areas are safe they will release the site to the AHJ. Fire officials should conduct their own inspection for fire safety risks before returning control of the site to the property owner.

Unexploded or misfired fireworks falling down-wind/down-range should be isolated with a minimum 100 meter exclusion zone. Do not apply water. Do not approach the unexploded fireworks. Allow the Lead Fireworks Supervisor to dispose of the misfired fireworks at a time and in a manner he/she thinks is appropriate.

Although fireworks emergencies are rare, fire departments must develop plans for entry and rescue operations in the fireworks launching area. If fireworks personnel are injured by exploding or burning fireworks the injured person should be escorted to medical help outside the launch area by members of the fireworks crew. Fire fighters should not enter the launch area unless absolutely necessary to save lives.

Any entry into an area where display fireworks are burning or detonating in an unplanned manner is extremely hazardous and presents a grave life safety risk to fire fighters. Full personal protective equipment, including SCBA must be worn during emergency entry to the launch area. Entry teams should be kept as small as possible and a fully equipped Rapid Entry/Rescue Team must be standing by. Incident commanders may determine the risk to fire fighters is too great to allow for rescue operations. If all members of the fireworks crew have escaped, no entry to the launch area should be made under any circumstance. Allow the fireworks to burn. Avoid application of water. Many fireworks contain magnesium and other compounds which react violently with water. Use hose streams to protect spectators and exposures as required, keeping all fire fighters outside the fireworks launching area

Fire department operations must be directed to protecting people, structures and property outside the fireworks launching area. Do not enter the fireworks launching area, even after all obvious fire appears to be out and detonations have stopped. Allow significant time (2 hours minimum) for the launch area to cool. Seek advice from the Lead Fireworks Supervisor about how and when to enter the fireworks launching area after an emergency. The entry should be made by the Lead Fireworks Supervisor and the fireworks crew with fire fighters standing by outside the launching area, ready for rescue operations.

Injuries, unplanned detonation of display fireworks and fires in the launching area must be reported to the Explosives Regulatory Division of Natural Resources Canada by the Lead Fireworks Supervisor. ERD officials may contact the AHJ as part of their investigation of the incident. Fire authorities can also contact ERD directly.

Explosives Regulatory Division  
Telephone: (613) 948-5200  
Fax: (613) 948-5195  
E-mail: [canmet-erd@nrcan.gc.ca](mailto:canmet-erd@nrcan.gc.ca)

Fires resulting from a display fireworks event must be reported to the Office of the Fire Commissioner. Local Assistants should follow the regular procedures for filing fire incident reports.

Office of the Fire Commissioner  
Fire Incident Reporting  
Toll Free: 1-800-739-3473  
E-mail: [FIRS@cps.gov.sk.ca](mailto:FIRS@cps.gov.sk.ca)

### Conclusion

Local fire authorities have a significant role to play in the approval of plans for a display fireworks event. Natural Resources Canada depends on Local Authorities Having Jurisdiction to screen all applications for approval of events. Fireworks Supervisors can not purchase display fireworks for an event without approval from the AHJ.

Fire officials also have a clearly defined role. They must ensure event plans provide for adequate levels of fire and life safety. Fire authorities should be available to answer questions and provide advice on matters of fire safety. The AHJ must also be ready to cancel or stop a fireworks show in the event of significant fire or life safety threats. Local fire authorities must not become involved with the actual organization of a show. For example, the AHJ should not approach property owners to secure permission for a show. That is the job of the sponsoring organization and the Lead Fireworks Supervisor. But, the AHJ should contact property owners,

to find out if they clearly understand the risks associated with a display fireworks show, when evaluating an application for a fireworks event.

Local fire authorities have responsibility to ensure public safety by making sure the approved plans for a display fireworks event are followed. This responsibility includes attendance at the site before, during and after a show as well as maintaining a fire watch down-wind and down-range of the event. A fire department representative should also be present during the morning-after inspection by the fireworks crew. Fire fighters should then make their own inspection of the site for safety hazards before releasing the property to the owner.

**Display Fireworks Event Approval/Safety Checklist**

Appendix A

**Approval Process**

<input type="checkbox"/> Display Fireworks Event Approval/Purchase Form received	
<input type="checkbox"/>	Name of Applicant and contact information
<input type="checkbox"/>	Applicant's Supervisor Certificate number and Expiry Date
<input type="checkbox"/>	Fireworks Company name and contact information (if applicable)
<input type="checkbox"/>	Sponsoring Organization or Individual contact information
<input type="checkbox"/>	Name of Insurance Agency, contact information, amount of the policy and written proof of insurance
<input type="checkbox"/>	Fireworks on-site storage location and details
<input type="checkbox"/>	Copy of Site Plan received and approved – site inspection completed
<input type="checkbox"/>	Written permission from site owner and adjacent property owners (as required)
<input type="checkbox"/>	Written description of the proposed event, including details of site security, EMS/First Aid provisions and fireworks crew members
<input type="checkbox"/>	Required alterations (if required) made to event plan
<input type="checkbox"/>	Date the Approval/Purchase Form was approved by AHJ

**Pre-event Planning**

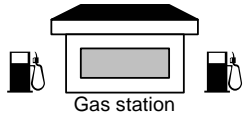
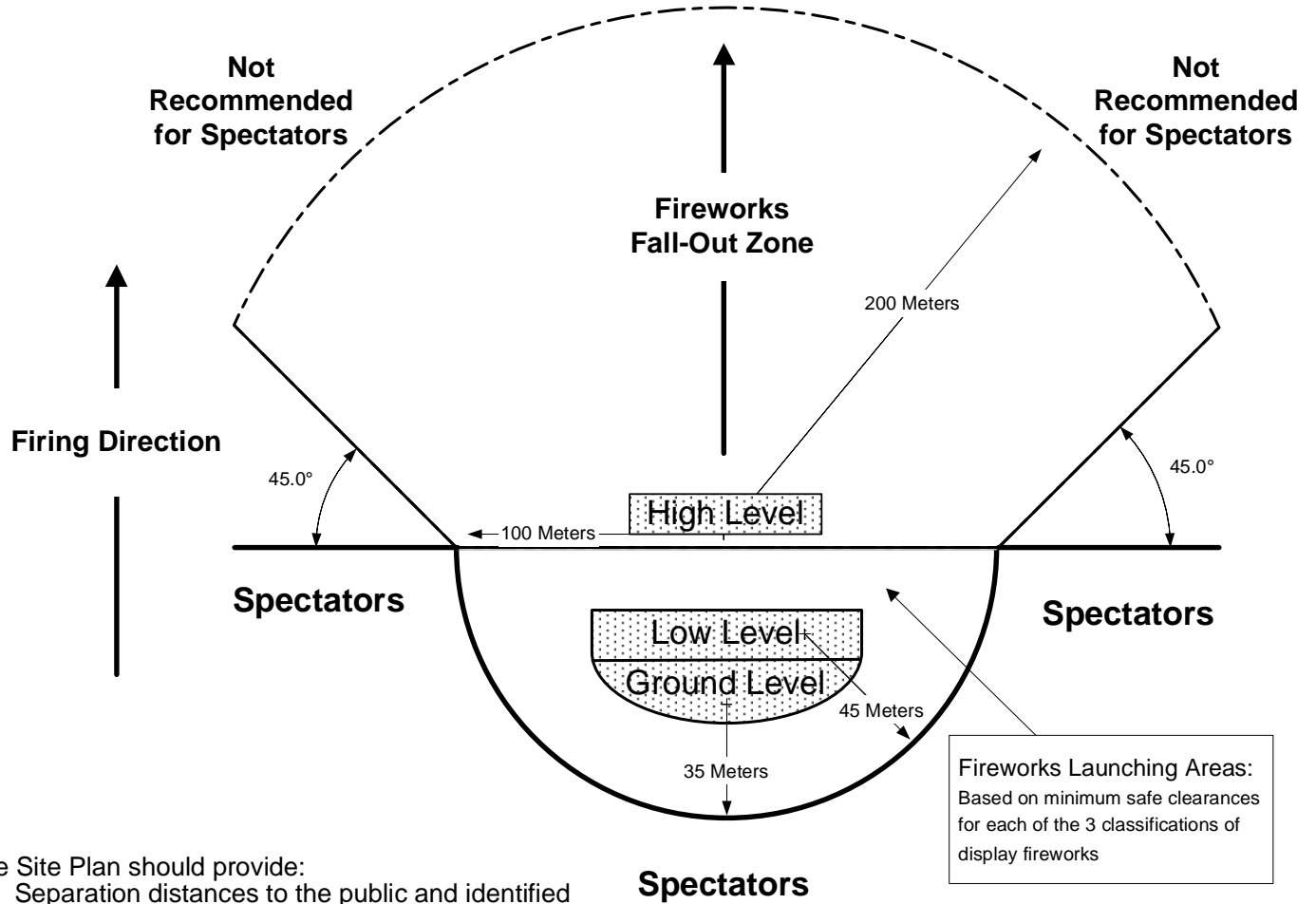
<input type="checkbox"/> Pre-event safety meeting held with Lead Fireworks Supervisor, EMS/First Aid providers, sponsoring organization and head of site security	
<input type="checkbox"/>	Communications protocols and methods developed
<input type="checkbox"/>	Event cancellation or stop procedures established
<input type="checkbox"/>	Vehicle staging area established
<input type="checkbox"/>	Clear access route established
<input type="checkbox"/>	Site security detailed to keep access route open
<input type="checkbox"/>	Down-range/down-wind fire watch procedures established
<input type="checkbox"/>	Establish procedure for control of unexploded/misfired fireworks outside of the launch area
<input type="checkbox"/>	Withdrawal and Mutual Aid procedures established
<input type="checkbox"/>	Safety briefing scheduled for all on-site personnel on day of event
<input type="checkbox"/>	Establish SOP's for rescue operations in launching area



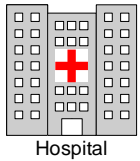
**Event Day Activities**

<input type="checkbox"/>	Conduct safety briefing and site inspection with Lead Fireworks Supervisor, EMS/First Aid providers, sponsors and site security personnel
	<input type="checkbox"/> Ensure site set-up conforms with approved plan
	<input type="checkbox"/> Review communications protocols
	<input type="checkbox"/> Conduct familiarization inspection of fireworks launching area with Lead Supervisor prior to show
	<input type="checkbox"/> Review Fire Department SOP's for rescue of injured personnel inside the fireworks launching area with the Lead Fireworks Supervisor
	<input type="checkbox"/> Review 2-way radio safety protocols – ensure all emergency service personnel know where and where not to use portable and vehicle mounted radios - consult with the Lead Fireworks Supervisor
	<input type="checkbox"/> Stage vehicle and crews up-wind and up-range of launch area (minimum of 100 meters)
	<input type="checkbox"/> Maintain clear access route
	<input type="checkbox"/> Ensure all emergency personnel stay out of fireworks launching area during the show and for at least 30 minutes after the show, or longer at the direction of the Lead Fireworks Supervisor
	<input type="checkbox"/> Review procedures for control of unexploded/misfired fireworks falling outside of the launch area
	<input type="checkbox"/> Deploy fire watch down-wind and down-range as required
	<input type="checkbox"/> Maintain fire watch after the show as required
	<input type="checkbox"/> Conduct site decommissioning inspection the morning following the event to ensure no dangerous/hazardous conditions exist

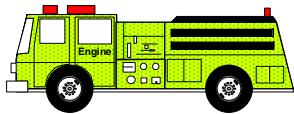
### Typical Fireworks Display Site Plan



- Maintain **300** meter clearance from:
- ♦ Gas Stations
  - ♦ Bulk flammable liquid storage
  - ♦ Hazardous/toxic materials storage sites



- Maintain **300** meter clearance from:
- ♦ Hospitals
  - ♦ Senior's Homes
  - ♦ Other Institutional Buildings



- Maintain **100** meter clearance from:
- ♦ Fire, EMS & Police Vehicles
  - ♦ Sponsor & Crew Vehicles
  - ♦ All Spectator Vehicles
- Maintain an open route on/off site for Emergency Vehicles

- The Site Plan should provide:
- ♦ Separation distances to the public and identified fire and safety hazards
  - ♦ Positions of the launching areas (known as ramps)
  - ♦ The fireworks fall-out zone
  - ♦ Direction of firing
  - ♦ Significant ground features, roads and rights-of-way, structures, overhead obstructions, parking areas, egress routes and spectator viewing areas
  - ♦ Locations set aside for emergency vehicles
  - ♦ An arrow indicating north

