BC Wildfire Service Aviation Contacts

Provincial Aviation Management 3080 Airport Drive Kamloops, BC V2B 7X2	250.312.3010
Provincial Air Tanker Centre 3080 Airport Drive Kamloops, BC V2B 7X2	250.312.3020
Cariboo Fire Centre—Aviation 3020 Airport Road Williams Lake, BC V2G 5M1	250.989.2600
Coastal Fire Centre—Aviation 665 Allsbrook Road Parksville, BC V9P 2T3	250.951.4243
Kamloops Fire Centre—Aviation 4000 Airport Road Kamloops, BC V2B 7X2	250.554.5504
Northwest Fire Centre—Aviation Bag 5000 Airport Road Smithers, BC V0J 2N0	250.847.6613
Prince George Fire Centre—Aviation Fifth Floor, 1011 – 4th Avenue Prince George, BC V2L 3H9	250.565.4147
Southeast Fire Centre—Aviation 208 Hughes Road Castlegar, BC V1N 4M5	250.365.4041

Product information available from:	
ICL Performance Products Canada Ltd. 3060 Airport Rd. Kamloops, BC V2B 7X2 www.phos-chek.com	250.554.3530

Retardants & Suppressants

BC Wildfire Service

BRITISH COLUMBIA

Ministry of Forests, Lands, Natural Resource Operations and Rural Development

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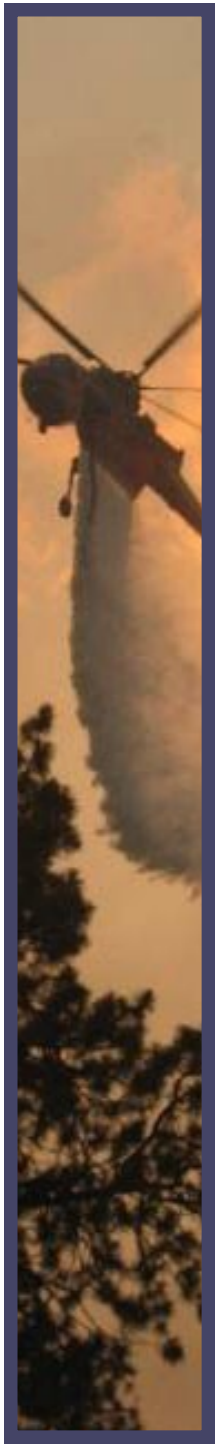


Retardant and Suppressant Purpose

While fire fighting retardants and suppressants do not extinguish fires on their own, they are valuable tools used to fight wildfire.

Choosing the correct retardant or suppressant for the specific site application requires understanding not only of the properties of the product, but of the factors that could influence its effectiveness and dispersal.

Suppressants offer short term impacts on the wildfire, and retardants offer longer term impacts. A clear understanding of the intent or purpose of utilizing the product will often affect the choice.

Some product considerations to be considered are:

- current fire activity within the fire centre area.
- current fire behavior on the targeted fire.
- expected impact upon terrain and fuels by the retardant application:
  - the depth of the fuel will impact its coverage.
  - the spacing and arrangement of the standing fuels will affect its penetration to ground level fuels.
- anticipated effect of weather and terrain on the application of the product.
- weather conditions that impact how long the product will stay effective.
- weather patterns that could affect the fire behavior in the foreseeable future.
- evaluations of the impacts of the retardant, both on the fuels and fire, and the crew efficiency within the drop area.

Long Term Retardants *(the "Red Stuff")* *cont*

The salts in the fire retardant, when heated by the approaching fire, react with the woody material, grass and other organic matter inhibiting burning and thus retarding the fire spread. This reaction is independent of the water content of the retardant, and is effective as long as the salts cling to the grass or woody material. Treated areas will normally retard the spread of fire through dry hot weather conditions. The red colour results from the iron oxides in the product, and permits it to be seen by ground and air personnel after application.

Once the fire reaches the retardant, the fire will consume the retardant. On treated areas that are not reached by the fire, rain (6.5 – 13 millimeters) may dilute the retardant. The resulting liquid retardants will not leach far into the soil. Once in contact with the soil, they provide readily available forms of nitrogen, phosphates and sulphur important for plant fertilization.

If retardant lands on materials (houses, cars, etc) the manufacturer recommends that it should be removed as soon as possible. They state it is readily washed off with water while still wet, and when dry it may require some scrubbing with water or power washing. They recommend a mild detergent to assist in the removal. They note that staining may occur on some surfaces from the iron oxide (rust) in the product, if the material is left on the surfaces.

More information on how the homeowner can remove retardant is available from the contractor who provides the product to the BC Wildfire Service. Please contact the local Fire Centre Aviation contact (see last page) with concerns and contact details, and we will facilitate the information flow. Retardants have the highest product cost, and also the highest cost of delivery.

Initial Attack delivery is through fixed wing air tankers. Expanded Attack delivery can be provided by "mud pits" that are open mixing tanks the helicopters can dip out of, with an agitation system to prevent the retardant from settling out of the water.

Gel *(the "Blue Stuff")*

Gel is a fire suppressant mixture that acts to make water more effective. The mixture is over 98 % water, a small percentage of surfactants and about 1-1.5% gelating agent. The gel is a super absorbent polymer product that acts like a sponge and readily absorbs water to transform the water into a heat absorbing gel.

The gel adheres to any surface, and forms a protective layer of that cools and protects objects from heating, charring and flame impingement.

Once applied, Gel will last for several hours, gradually releasing its water through evaporation and then naturally breaking down to environmentally inert materials. Once the water has evaporated Gel is no longer useful, and must be applied near the approaching fire front to be effective. Strong winds and high temperatures will decrease its protection time. The blue colour is added and permits it to be seen by ground and air personnel after application.

Gels are very slippery once applied, and can affect crew movement through forested areas. Crews are cautioned to not use downed trees as "bridges" to walk along while in Gel treated heavy fuels, as the applied Gel can make the bark very slippery and cause falling injuries.

On Expanded Attack on larger fires, Gel can be mixed in tanks and applied by helicopter. Gels have a moderate cost.

Long Term Retardants *(the "Red Stuff")*

Long term retardants are "chemical retardants" that do not require water to be effective. This means they work well wet or dry, and can be applied in advance of the fire in the expected path of the fire. The active ingredient in the retardant reacts with the fuel, rendering it less combustible.

Retardant and Suppressant Purpose

Buying time

Retardants and suppressants are just what the name says: they retard or slow down the fire, or suppress its behavior. They can also reduce the fire intensity and rate of spread.

This can allow the efficient and safe deployment of other resources to the fire.

Safety of Crews and Preparedness

Safety is always our number one priority, and utilizing certain retardants can speed the work of the Initial Attack crews by ensuring they get in and get their work done, then get out and back to base as soon as possible.

This also allows our Initial Attack resources to be ready to respond to the next target.

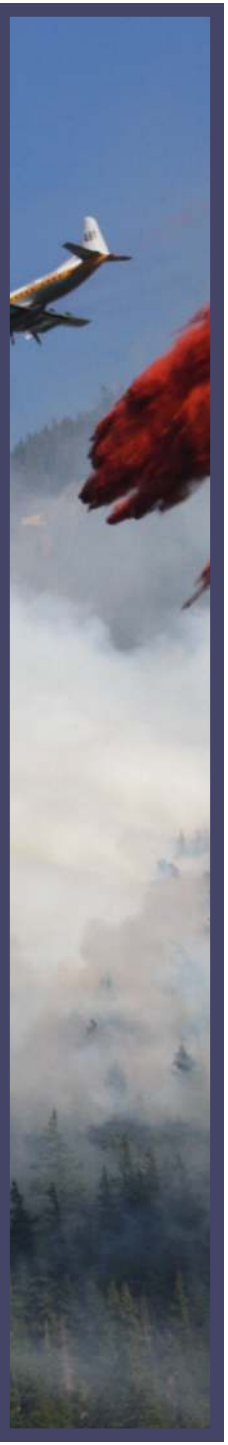
Cost effectiveness

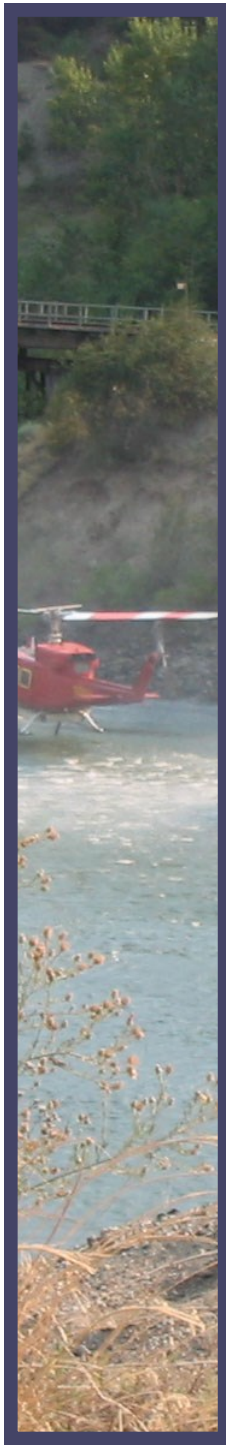
Retardants vary greatly in cost of application and cost of product. Getting the "best bang for your buck" may affect the choice of retardant type.

Curbing future fire activity

Utilizing retardants can strengthen control lines and natural features by reducing the fire behavior and activity when the fire reaches those control features. For example, reducing the fire behavior by moving the fire from the canopy to the ground can make fire less able to challenge or jump the control line or feature.

It can also affect the ability of airborne sparks and fire brands to ignite new fuels.





Water

Water is a fire suppressant that acts on the fire by cooling the fire and reducing fire behavior.

On the ground, water is applied by fire crews from water bags, tanks, pumps and hoses. Air application of water can be by helicopters or fixed wing airtankers.

Water evaporates quickly in hot, dry, windy conditions, and these extreme weather conditions may cause significant evaporation during aerial drops. Very low height applications from helicopters (or airtankers, if topography permits) can lessen the impact of air evaporation on water volumes.

Water must be applied very closely to the fire front, or directly upon the fire, to be effective.

Water, as it is converted to steam, has a tremendous ability to absorb and carry away heat. The strong surface tension of water may cause it to bead up and roll off fuels. Once the water is evaporated, the suppressing activity ceases and the fire will return to its former fire behavior.

Water itself has no cost, and is picked up from streams, ponds and small lakes. The cost of water transportation is dependent upon distance, the volume contained by the transport mechanism and aircraft costs.

Wet Water *(Surfactants or "Foam")*

Wet Water is a mixture of water and a concentrated soap-like surfactant. Although sometimes called "foam", it often doesn't bubble and foam with proper application.

Wet Water *(Surfactants or "Foam")* *cont*

The surfactant breaks the surface tension of the water and allows the mixture to flow over fuels better, and penetrate the ground fuels deeper, without beading up on the surface.

"Dry Foam" has big bubbles which will prevent its penetration into ground fuels, but "stick" to trees. "Wet Foam" looks slightly white as it exits the aircraft, but penetrates ground fuels well.

Wet Water concentrate is low cost, is a more effective wetting agent than water, and has the benefit of acting more effectively than straight water on fuels. This significantly lowers aircraft costs by reducing the number of reloads necessary to have the same effect on the fire that straight water would.

Wet Water can be applied from helicopter buckets by a pilot controlled injection system or by crews on the ground with apparatus that have injector nozzles.

The minimal residue on the helicopter buckets that are outfitted with surfactant injection systems may wash off the buckets during reloading with water, but it primarily floats on the surface of the water and produces minimal impact on fish. The risk to fish is a physical one, not a chemical one, as surfactants break the water tension in water and impact the oxygen transfer in gill plates in the gills of fish. High concentrations of surfactant would be necessary to interfere with the fish's ability to breath, and the bucket "back wash" is not considered significant in flowing water or small to large ponds.

Surfactants handled by crews can dry skin in high concentrations, and crews are cautioned to use waterproof gloves and eye protection while handling this product to prevent skin irritation.

Wet Water does not bead, is not shed as easily by fuels, and is more able to fully take advantage of water's ability to absorb heat completely and carry it away as it is converted to steam. Wet water has an affinity for carbon, and tends to hold it like a magnet. This bonds the water to the fuel, and gives it the ability to grab and capture smoke.