

Chapter – 18

Suppression Chemicals & Delivery Systems

Policy for Use of Fire Chemicals

Use only products qualified and approved for intended use. Follow safe handling procedures, use personal protective equipment recommended on the product label and *Material Safety Data Sheet* (MSDS).

A current list of qualified products and approved uses can be found on the Wildland Fire Chemical Systems (WFCS) website at <http://www.fs.fed.us/rm/fire/wfcs/index.htm>.

Refer to local jurisdictional policy and guidance related to use of wildland fire chemicals for protection of historic structures.

Products must be blended or mixed at the proper ratio prior to being loaded into the aircraft. Quality control and safety requirements dictate that mixing or blending of wildland fire chemicals be accomplished by approved methods.

Types of Fire Chemicals

Long-Term Retardant

Long-term retardants contain fertilizer salts that change the way fuels burn. They are effective even after the water has evaporated. Retardants may be applied aerielly by large air tanker, single engine airtanker (SEAT) and helicopter bucket. Some retardant products are approved for fixed tank helicopters. Some products are formulated specifically for delivery from ground sources. See the Qualified Products List (QPL) for specific uses for each product.

Recommended coverage levels and guidelines for use can be found in the *10 Principles of Retardant Application*, NFES 2048, PMS 440-2 pocket card. Retardant mixing, blending, testing, and sampling requirements can be found at the WFCS website, Lot Acceptance and Quality Assurance page: <http://www.fs.fed.us/rm/fire/wfcs/laqa.htm>.

Fire Suppressant Foam

Fire suppressant foams are combinations of wetting and foaming agents added to water to improve the effectiveness of the water. They are no longer effective once the water has evaporated. Foam may be applied by engines, portable pumps, helicopters, and SEAT's. Some agencies also allow application of foam from fixed-wing water scoopers. See the QPL for specific uses for each product.

Wet Water

Using foam concentrates at a mix ratio of 0.1 percent will produce a wet water solution.

Water Enhancer (Gel)

Water enhancers, such as fire fighting gels, are added to water to improve the viscosity and adhesion of water. They are not effective once the water has evaporated. These products may be used in structure protection within the wildland interface or on wildland fuels. They are fully approved for use in helicopter bucket and engine application. Many are also approved, at specific mix ratios, for use in SEAT's, and fixed tank helicopters. See the QPL for specific uses for each product.

Safety Information**Personnel Safety**

All qualified wildland fire chemicals meet minimum requirements (June 2007) in regard to aquatic and mammalian toxicity (acute oral toxicity, acute dermal toxicity, primary skin irritation, and primary eye irritation). Specifications for long-term retardants, fire suppression foams, and water enhancers can be found on the WFCS website.

Personnel involved in handling, mixing, and applying fire chemicals or solutions shall be trained in proper procedures to protect their health and safety and the environment. Approved fire chemicals can be irritating to the eyes. Personnel must follow the manufacturer's recommendations; including use of PPE, as found on the product label and product MSDS. The MSDSs for all approved fire chemicals can be found on the website at <http://www.fs.fed.us/rm/fire/wfcs/msds.htm>.

Human health risk from accidental drench with fire chemicals can be mitigated by washing with water to remove any residue from exposed skin.

Containers of any fire chemical, including backpack pumps and engine tanks, should be labeled to alert personnel that they do not contain only water and the contents are not potable.

Slippery footing is a hazard at storage areas, unloading and mixing sites, and wherever applied. Because all fire chemical concentrates and solutions contribute to slippery conditions, all spills must be cleaned up immediately, preferably with a dry absorbent pad or granules. Firefighters should be aware that fire chemicals can conceal ground hazards. Wildland fire chemicals can penetrate and deteriorate leather boots resulting in wet feet and potentially ruined leather.

Aerial Application Safety

Personnel and equipment in the flight path of intended aerial drops should move to a location that will decrease the possibility of being hit with a drop.

Personnel near aerial drops should be alert for objects (tree limbs, rocks, etc.) that the drop could dislodge. The *Incident Response Pocket Guide* (IRPG) provides additional safety information for personnel in drop areas.

During training or briefings, inform all fire personnel of environmental guidelines and requirements for fire chemicals application and avoid contact with waterways.

Avoid dipping from rivers or lakes with a helicopter bucket containing residual fire chemicals without first cleaning/washing down the bucket.

Consider setting up an adjacent reload site and manage the fire chemicals in portable tanks or terminate the use of chemicals for that application.

Interagency Policy for Aerial and Ground Delivery of Wildland Fire Chemicals near Waterways and Other Avoidance Areas

This policy is an expansion and update for the 2000 and 2009 updated Guidelines for Aerial Delivery of all wildland fire chemicals, including retardant, foam, and water enhancers, which were established and approved by the USFS and the DOI. The policy includes additional avoidance areas (both aquatic and terrestrial) for aerial delivery of fire chemicals as designated by individual agencies and includes additional USFS reporting requirements.

This policy does not require the helicopter or airtanker pilot-in-command to fly in such a way as to endanger his or her aircraft, other aircraft, or structures or compromise ground personnel safety.

Aerial Delivery Policy	Ground Delivery Policy
<ul style="list-style-type: none"> • Avoid aerial application of all wildland fire chemicals within 300 feet (ft.) of waterways. • Additional mapped avoidance areas may be designated by individual agency. • For FS, whenever practical, as determined by the fire incident commander, use water or other less toxic wildland fire chemical suppressants for direct attack or less toxic approved fire retardants in areas occupied by threatened, endangered, proposed, candidate or sensitive species (TEPCS) or their designated critical habitats. 	<ul style="list-style-type: none"> • Avoid application of all wildland fire chemicals into waterways or mapped avoidance areas.

Definition of Waterway

Any body of water (including lakes, rivers, streams, and ponds) whether or not it contains aquatic life.

Definition of Waterway Buffer

300 ft. distance on either side of a waterway.

Definition of Additional Mapped Avoidance Areas

On FS lands, there may be areas requiring additional protection outside of the 300 ft. waterway buffer. This may include certain dry intermittent or ephemeral streams for resource protection, as well as areas for the protection of TEPCS terrestrial habitats and population areas.

Guidance for pilots

Pilots will avoid all waterways and additional mapped avoidance areas designated by individual agencies. To meet the 300 ft waterway buffer zone or additional mapped avoidance areas guideline, implement the following:

- All Aircraft: When approaching a waterway or other avoidance areas, the pilot shall terminate application of wildland fire chemical approximately 300 ft. before reaching the area. When flying over a waterway, the pilot shall not begin application of wildland fire chemical until 300 ft. after crossing the far bank or shore. The pilot shall make adjustments for airspeed and ambient conditions such as wind to avoid the application of wildland fire chemicals within the 300 ft. buffer zone. Riparian vegetation may be an indicator of waterways and pilots should confirm to the extent possible that no water is present before dropping.

Additional guidance to pilots for any aircraft supporting a fire on FS lands

- FS may have additional mapped avoidance areas for TEPCS species, waterway buffers exceeding 300 ft. or certain intermittent or ephemeral waterways that are identified as avoidance areas for resource protection. Any aerial supervision resource should inquire if these avoidance areas exist on any FS fire they are providing support to;
- Prior to fire retardant application, all aerial supervision and/or pilots shall be briefed by dispatch on the locations of all TEPCS or other avoidance areas in the vicinity;
- If operationally feasible, pilots or the aerial supervision shall make a 'dry run' over the intended application area to identify avoidance areas and waterways in the vicinity of the wildland fire; and
- Pilots should be provided avoidance area maps and information at all briefings (if not dispatched from one geographic area/unit and delivering to another geographic area).

Exceptions for USDA Forest Service

- Deviations from the policy are allowed only for the protection of life or safety (public and firefighter).

Exceptions for all other Agencies

- When alternative line construction tactics are not available due to terrain constraints, congested area, life and property concerns or lack of ground personnel, it is acceptable to anchor the wildland fire chemical application to the waterway. When anchoring a wildland fire chemical line to a waterway, use the most accurate method of delivery in order to minimize placement of wildland fire chemical in the waterway (e.g., a helicopter rather than a heavy airtanker);
- Deviations from the policy are acceptable when life or property is threatened and the use of wildland fire chemical can be reasonably expected to alleviate the threat; and
- When potential damage to natural resources outweighs possible loss of aquatic life, the unit administrator may approve a deviation from these guidelines.

Reporting Requirements of Aerially Delivered Wildland Fire Chemicals into Waterways, Waterway Buffer Areas and Mapped Avoidance Areas

During training or briefings, inform field personnel of:

- environmental guidelines for fire chemical application;
- requirements for avoiding contact with waterways;
- additional mapped avoidance areas as designated by individual agency, and
- their responsibility for upward reporting in the event of application, for whatever reason, into avoidance areas.

If application of wildland fire chemical occurs or anyone believes it may have been introduced within waterways, waterway buffered areas, or other mapped avoidance areas, the following is required as appropriate:

- they should inform their supervisor;
- the information will be forwarded to incident management and the agency administrator, usually through the resource advisor;
- the incident or host authorities must immediately contact specialists within the local jurisdiction; and
- notifications and reporting will be completed as soon as possible.

Procedures have been implemented for the required reporting. All information, including reporting tools and instructions are posted on the websites at: <http://www.fs.fed.us/rm/fire/wfcs> and <http://www.fs.fed.us/fire/retardant>.

The USFS has additional reporting requirements for threatened, endangered, proposed, candidate and USFS listed sensitive species for aerially delivered fire retardant only. This requirement resulted from the Forest Service's acceptance of Biological Opinions received from the NMFS and the FWS, and the *2011 Record of Decision for Nationwide Aerial Application of Fire Retardant on National Forest System Lands*. The procedures, reporting tools, and instructions can be found at the same websites listed above.

Endangered Species Act (ESA) Emergency Consultation

The USFS has completed consultation with regulatory agencies (FWS and NOAA) for aerial delivery of fire retardant (only) on National Forest System lands; please refer to <http://www.fs.fed.us/fire/retardant/> for additional information and re-initiation of consultation requirements.

The following provisions are guidance for complying with the emergency section 7 consultation procedures of the ESA for wildland fire chemicals. These provisions do not alter or diminish an action agency's responsibilities under the ESA.

Where T&E species or their habitats are potentially affected by application of wildland fire chemicals, the following additional procedures apply and shall be documented in initial or subsequent fire reports:

- As soon as practicable after application of wildland fire chemical near waterways or other avoidance area as designated by agency, determine whether the application has caused any adverse effects to a T&E species or their habitat. This can be accomplished by the following:
 - Ground application of wildland fire chemical outside a waterway is presumed to avoid adverse effects to aquatic species and no further consultation for aquatic species is necessary;
 - Aerial application of wildland fire chemical outside 300 ft. of a waterway is presumed to avoid adverse effects to aquatic species and no further consultation for aquatic species is necessary;
 - Aerial application of wildland fire chemical within 300 ft. of a waterway requires that the unit administrator determine whether there have been any adverse effects to T&E species within the waterway. If no adverse effects to aquatic T&E species or their habitats, no additional requirement to consult on aquatic species with FWS or NMFS is required; and
 - Application of wildland fire chemical within other avoidance areas as designated by agency requires the agency administrator to determine whether there have been any adverse effects to T&E species. If there are no adverse effects to species or their habitats there is no additional requirement to consult with FWS or NMFS.

If the action agency determines that there were adverse effects on T&E species or their habitats then the action agency must consult with FWS and NMFS, as required by 50 CFR 402.05 (Emergencies). Procedures for emergency consultation are described in the *Interagency Consultation Handbook*, Chapter 8 (March, 1998). In the case of a long duration incident, emergency consultation should be initiated as soon as practical during the event. Otherwise, post-event consultation is appropriate. The initiation of the consultation is the responsibility of the unit administrator.

Operational Guidelines for Invasive Species

Refer to Chapter 14 for guidance on minimizing potential transmission of invasive species.