Chapter 19
Suppression Chemicals and Delivery Systems

A. Introduction

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: http://www.fs.fed.us/rm/fire/wfcs/index.htm

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.

B. Types of Fire Chemicals

1. 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 aerially by large air tanker, single engine air tanker (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 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.

2. 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 SEATs. Some agencies also allow application of foam from fixed-wing water scoopers. See the QPL for specific uses for each product.

3. Wet Water

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

4. 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 SEATs, and fixed tank helicopters. See the QPL for specific uses for each product.

C. Safety Information

1. 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 web site 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.

2. 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.

D. Policy for Delivery of Wildland Fire Chemicals near Waterways

Avoid aerial application of wildland fire chemicals within 300 feet of waterways and any ground application of wildland fire chemicals into waterways. The policy has been adopted from the *2000 Guidelines for Aerial delivery of Retardant or Foam near Waterways* which were established and approved by the FS, BLM, NPS, and FWS. It has been expanded to include all wildland fire chemicals, including water enhancers.

This policy was updated in 2009 and can be found at.
http://www.fs.fed.us/rm/fire/wfcs/Application_Policy-MultiAgency_042209-UPDATE.pdf

1. Exceptions

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 to a waterway, use the most accurate method of delivery in order to minimize placement of wildland fire chemicals in the waterway (e.g., a helicopter rather than a heavy air tanker).

When potential damage to natural resources outweighs possible loss of aquatic life, the unit administrator may approve a deviation from these guidelines.

2. Definition of Waterway

Any body of water including lakes, rivers, streams and ponds whether or not they contain aquatic life.

3. Guidance for Pilots

To meet the 300-foot buffer zone guideline, implement the following:

- Medium/Heavy Air tankers

  When approaching a waterway visible to the pilot, the pilot shall terminate the application of wildland fire chemical approximately 300 feet before reaching the waterway. When flying over a waterway, pilots shall wait one second after crossing the far bank or shore of a waterway before applying wildland fire chemical. Pilots shall make adjustments for airspeed and ambient conditions such as wind to avoid the application of wildland fire chemical within the 300-foot buffer zone.

- Single Engine Air tankers

  When approaching a waterway visible to the pilot, the pilot shall terminate application of wildland fire chemical approximately 300 feet before reaching the waterway. When flying over a waterway, the pilot shall not begin application of wildland fire chemical until 300 feet 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 retardant within the 300-foot buffer zone.

- Helicopters

  When approaching a waterway visible to the pilot, the pilot shall terminate the application of wildland fire chemical 300 feet before reaching the waterway. When flying over a waterway, pilots shall wait five seconds after crossing the far bank or shore before applying the wildland fire chemical. Pilots shall make adjustments for airspeed and ambient conditions such as wind to avoid the application of wildland fire chemicals within the 300-foot buffer zone.

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

4. Reporting Requirements of Wildland Fire Chemicals into Waterways

Any fire chemicals aerially applied into a waterway or within 300 feet of a waterway require prompt upward reporting to incident management and agency administrator. Notifications will also be made for any spills or ground applications of fire chemicals into waterways or with potential to enter the waterway.

If it is believed that fire chemicals have been introduced into a waterway, personnel should immediately inform their supervisor. The incident or host authorities must immediately contact appropriate regulatory agencies and specialists within the local jurisdiction.

Initial notifications of wildland fire chemical mishaps will be reported as soon as possible to the WFCS Fire Chemical Project Leader in Missoula, Montana at phone 406-329-4859 (if no answer please leave message) or to individuals listed on website referenced below. Include the date, location, and extent of the mishap.

All information, including reporting form and instructions, are posted on the web site at: http://www.fs.fed.us/rm/fire/wfcs/report.htm

E. Endangered Species Act (ESA) Emergency Consultation

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

Where aquatic threatened &endangered (T&E) species or their habitats are potentially affected by aerial application of wildland fire chemical, the following additional procedures apply:

- As soon as practicable after the aerial application of wildland fire chemical near waterways, determine whether the aerial application has caused any adverse effects to a T&E species or their habitat. This can be accomplished by the following:

  - 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.

- These procedures shall be documented in the initial or subsequent fire reports:

  - If there were no adverse effects to aquatic T&E species or their habitats, there is no additional requirement to consult on aquatic species with Fish and Wildlife Service (FWS) or National Marine Fisheries Service (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/or 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.

Ground application of a wildland fire chemical into a waterway also requires determining whether the application has caused any adverse effects to a T&E species or their habitat. The procedures identified above also apply.

Each agency is responsible for ensuring that their appropriate agency specific guides and training manuals reflect these standards.

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