Chapter 12
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:

- http://www.fs.fed.us/rm/fire/wfcs/index.htm
- Link to appropriate Qualified Products List (QPL)

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 aerially 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 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 SEATs. 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 SEATs, 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 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.

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.

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

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 airtanker).

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

- ***FS-*** *The Record of Decision for the Nationwide Aerial Application of Fire Retardant on National Forest System Land replaces the 2000 Guidelines with fire retardant direction (still policy). This direction includes 300' (or*

larger) buffers on either side of waterways or avoidance areas for certain threatened, endangered, proposed, candidate, or sensitive (TEPCS) aquatic species. The waterway and buffers have been mapped and should be provided to any firefighting personnel affiliated with the ordering and directing the delivery of aerially applied fire retardant.

The direction also includes mapped avoidance areas for TEPCS terrestrial species. These avoidance areas do not allow for the aerially delivery of fire retardants.

Exception: The one exception allowed for dropping fire retardants in any waterway, 300' (or larger) buffer, or mapped avoidance area is when human life or safety is threatened and the use of retardant can be reasonably expected to alleviate the threat.

This direction applies to any wildland fire chemical that is aerially applied, not just fire retardant.

Definition of Waterway- 2000 Guidelines

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

- ***FS- Definitions***
  - ***Aquatic Avoidance Areas-*** *All waterways with a 300-foot (or larger) buffer; this includes perennial streams, intermittent streams, lakes, ponds, identified springs, reservoirs, and vernal ponds.*
  - ***Terrestrial Avoidance Area-*** *Mapped area used to avoid impacts on one or more federally listed threatened, endangered, or proposed plant or animal species or critical habitat where aerial application of fire retardant may affect habitat and/or populations and for any FS terrestrial sensitive or candidate species where aerial application of fire retardant may result in a trend toward federal listing under ESA or a loss of viability on the planning unit.*

Guidance for Pilots

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

- **Medium/Heavy Airtankers:** 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 Airtankers:** 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 airtanker pilot-in-command to fly in such a way as to endanger his or her aircraft, other aircraft, structures, or compromise ground personnel safety.

- ***FS-*** *The following is in addition to guidance to pilots for any aircraft supporting a fire on National Forest lands:*
  - *National Forest lands may have mapped avoidance areas for Threatened, Endangered, Proposed, Candidate, or Sensitive (TEPCS) species, and waterways that are excluded from aerially applied wildland fire chemicals. Any aerial supervision resource should inquire if these avoidance areas exist on any Forest Service fire they are providing support to. Include the reporting requirements in the briefing if a misapplication of fire chemical occurs.*
  - *Prior to fire retardant application, all pilots shall be briefed on the locations of all TEPCS avoidance areas on the unit.*
  - *Prior to aerial application of fire retardant, the pilot will make a "dry run" over the intended application area to identify avoidance areas and waterways in the vicinity of the wildland fire if it is operationally feasible (urgency to drop).*
  - *When approaching an avoidance area mapped for TEPCS species, waterway, or riparian vegetation visible to the pilot, the pilot will terminate the application of retardant approximately 300 feet before reaching the mapped avoidance area or waterway.*
  - *When flying over a mapped avoidance area, waterway, or riparian vegetation, the pilot will wait 1 (one) second before applying retardant.*
  - *Pilots will make adjustments for airspeed and ambient conditions such as wind to avoid the application of retardant within the 300-foot or larger buffer or avoidance area in order to avoid drift into protected areas.*
  - *Pilots are provided avoidance area maps at all briefings (if not dispatched from one geographic area/unit and delivering to another geographic area).*

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 administrators. 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 or buffer zone, 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/fire.

- ***FS -*** *Additional Reporting Requirements for TEPCS: Reporting is also required for all introductions of wildland fire chemicals into habitat for those TEPCS species identified by the U.S Fish and Wildlife Service (FWS) and Forest Service offices. The list and other information can be found at http://www.fs.fed.us/fire/retardant/eis_info.html. This requirement is part of the Record of Decision for the Nationwide Aerial Application of Fire Retardant and the completion of ESA Section 7 Consultation with the National Marine Fisheries Service (NMFS) and the FWS. When wildland fire chemicals adversely affect any threatened, endangered, proposed, or candidate species, or designated or proposed critical habitat as identified in the ROD and consultation with the Services, the Forest Service Line Officer must reinitiate consultation with the FWS and/or NMFS. The FS unit will coordinate and work with the local FWS or NMFS office to develop the appropriate monitoring plan or to implement the applicable terms and conditions, reasonable and prudent measures, or conservation measures issued as part of the consultation. The procedures, reporting form and instructions can be found at the same website as listed above.*

Endangered Species Act (ESA) Emergency Consultation for Agencies Other Than Forest Service

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 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 or within listed species habitats, 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 or listed species habitat is presumed to avoid adverse effects to species and no further consultation for species is necessary.
  - Aerial application of wildland fire chemical within 300 ft of a waterway or listed species habitat requires that the unit administrator determine whether there have been any adverse effects to T&E species.
- 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 or listed species terrestrial avoidance area (FS specific avoidance area) 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.

Operational Guidelines for Invasive Species

Refer to Chapter 11 for guidance on minimizing potential transmission of invasive species.