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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 and 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 website:

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

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

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

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 tankers, single engine airtankers (SEATs) and helicopter bucket. Some products are formulated specifically for delivery from ground sources. See the Qualified Products List for specific uses for each product.

Principles of application and recommended coverage levels are 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 Wildland Fire Chemical Systems 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 not 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 Qualified Products List for specific uses for each product.

1 Technical guidelines for equipment operations and general principles of foam
2 application are discussed in *Foam vs. Fire, Class A Foam for Wildland Fires,*
3 *NWCG, PMS 446-1, NFES 2246, 2nd ed., October 1993,* and *Foam vs. Fire,*
4 *Aerial Applications, NWCG, PMS 446-3, NFES 1845, October 1995.* Chapter
5 14 contains equipment used for application of wildland fire suppressant foams.

6

7 **Wet Water**

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

10

11 **Water Enhancer (including Gel)**

12 Water enhancers, such as fire fighting gels, are products added to water to
13 improve one or more of the physical properties of water. They are not effective
14 once the water has evaporated. These products may be used in structure
15 protection within the wildland interface or on wildland fuels. They are fully
16 approved for use in helicopter bucket and engine application. Many are also
17 approved, at specific mix ratios, for use in SEATs. See the Qualified Product
18 List for specific uses for each product.

19

20 **Safety Information**

21

22 **Personnel Safety**

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

28

29 Personnel involved in handling, mixing, and applying fire chemicals or solutions
30 shall be trained in proper procedures to protect their health and safety and the
31 environment. Personnel must follow the manufacturer's recommendations,
32 including use of PPE (i.e. goggles, gloves, eyewash kits on site) as found on the
33 product label and product Material Safety Data Sheet (MSDS). The MSDSs for
34 all approved fire chemicals can be found on the web site at
35 <http://www.fs.fed.us/rm/fire/wfcs/msds.htm>. Approved fire chemicals can be
36 irritating to the eyes. Anyone involved with or working in the vicinity of fire
37 chemical concentrates should use protective splash goggles.

38

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

41

42 Containers of any fire chemical, including backpack pumps and engine tanks,
43 should be labeled to alert personnel that they do not contain plain water, and that
44 the contents must not be used for drinking purposes.

45

1 Slippery footing is a hazard at storage areas, unloading and mixing sites, and
2 wherever applied. Because all fire chemical concentrates and solutions
3 contribute to slippery conditions, all spills must be cleaned up immediately,
4 preferably with a dry absorbent pad or granules. Personnel applying any
5 wildland fire chemical should stand in untreated areas. Specific to foam, it can
6 form a thick blanket that can conceal ground hazards. Wildland fire chemicals
7 can penetrate and deteriorate leather boots, resulting in wet feet and potentially
8 ruined leather.

9

10 **Aerial Application Safety**

11 The safety precautions associated with ground crews near retardant drops also
12 apply to aerial drops of all fire chemicals.

13

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

16

17 Persons near aerial drops should be alert for objects (tree limbs, rocks, etc.) that
18 the drop could dislodge.

19

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

23

24 Avoid dipping from rivers or lakes with a helicopter bucket containing residual
25 fire chemicals without first cleaning/washing down the bucket. Set up an
26 adjacent reload site and manage the fire chemicals in portable tanks, or
27 terminate the use of chemicals for that application.

28

29 **Policy for Delivery of Wildland Fire Chemicals near Waterways**

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

36

37 **Definition of Waterway**

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

40

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

44

45

46

1 Guidance for Pilots

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

- 3 • **Medium/Heavy Airtankers:** When approaching a waterway visible to the
4 pilot, the pilot shall terminate the application of wildland fire chemical
5 approximately 300 feet before reaching the waterway. When flying over a
6 waterway, pilots shall wait one second after crossing the far bank or shore
7 of a waterway before applying wildland fire chemical. Pilots shall make
8 adjustments for airspeed and ambient conditions such as wind to avoid the
9 application of wildland fire chemical within the 300-foot buffer zone.
- 10 • **Single Engine Airtankers:** When approaching a waterway visible to the
11 pilot, the pilot shall terminate application of wildland fire chemical
12 approximately 300 feet before reaching the waterway. When flying over a
13 waterway, the pilot shall not begin application of wildland fire chemical
14 until 300 feet after crossing the far bank or shore. The pilot shall make
15 adjustments for airspeed and ambient conditions such as wind to avoid the
16 application of retardant within the 300-foot buffer zone.
- 17 • **Helicopters:** When approaching a waterway visible to the pilot, the pilot
18 shall terminate the application of retardant or foams 300 feet before
19 reaching the waterway. When flying over a waterway, pilots shall wait five
20 seconds after crossing the far bank or shore before applying the wildland
21 fire chemical. Pilots shall make adjustments for airspeed and ambient
22 conditions such as wind to avoid the application of wildland fire chemicals
23 within the 300-foot buffer zone.

24

25 Exceptions:

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

39

40 Reporting Requirements of Wildland Fire Chemicals into Waterways

41 During training or briefings, inform field personnel of environmental guidelines
42 for fire chemical application and the requirements for avoiding contact with
43 waterways. All field personnel should also be provided with the following
44 reporting process and requirements. Notify incident management and the agency
45 administrator promptly of any fire chemicals aurally applied within 300 feet of
46 a waterway. Notifications will also be made for any spills or ground

1 applications of fire chemicals into waterways or with potential to enter the
2 waterway. If anyone believes that fire chemicals may have been introduced into
3 a waterway they should inform their supervisor. The information will be
4 forwarded to incident management and the agency administrator, usually
5 through the resource advisor. The incident or host authorities must immediately
6 contact appropriate regulatory agencies and specialists within the local
7 jurisdiction. Initial notifications of wildland fire chemical mishaps will be
8 reported as soon as possible to Wildland Fire Chemicals Systems in Missoula,
9 Montana at phone 406-829-6718 (if no answer please leave message) or to
10 individuals listed on website referenced below. Also include the date, location,
11 and extent of the introduction.

12
13 Procedures have been implemented for the required reporting. All information,
14 including reporting form and instructions, are posted on the web site at:
15 <http://www.fs.fed.us/rm/fire/wfcs/report.htm>.

- 16 • *FS - Additional Reporting Requirements for Threatened and Endangered*
17 *Species. Reporting is also required for all introductions of wildland fire*
18 *chemicals into habitat for those Threatened and Endangered species*
19 *identified by the U.S Fish and Wildlife Service (FWS). The list and other*
20 *information can be found at <http://www.fs.fed.us/fire/retardant/index.html>.*
21 *This requirement resulted from the Forest Service's acceptance of*
22 *Biological Opinions received from the National Marine Fisheries Service*
23 *(NMFS) and the U.S. Fish and Wildlife Service(FWS). When wildland fire*
24 *chemicals adversely affect any threatened, endangered, or proposed*
25 *species, or designated or proposed critical habitat, regardless of the 300'*
26 *waterway buffer zone, the Forest Service Line Officer must initiate*
27 *emergency consultation with the FWS and/or NMFS. The FS unit should*
28 *coordinate with the local FWS or NMFS office to monitor, determine*
29 *significance of effects, and design appropriate responsive measures. The*
30 *procedures, reporting form and instructions can be found at the same*
31 *website as listed above.*

32 33 **Endangered Species Act (ESA) Emergency Consultation**

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

38
39 Where aquatic threatened & endangered (T&E) species or their habitats are
40 potentially affected by aerial application of wildland fire chemical, the following
41 additional procedures apply:

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

- 1 • Aerial application of wildland fire chemical outside 300 ft of a
2 waterway is presumed to avoid adverse effects to aquatic species and
3 no further consultation for aquatic species is necessary.
- 4 • Aerial application of wildland fire chemical within 300 ft of a
5 waterway requires that the unit administrator determine whether there
6 have been any adverse effects to T&E species within the waterway.
- 7 • These procedures shall be documented in the initial or subsequent fire
8 reports:
- 9 • If there were no adverse effects to aquatic T&E species or their
10 habitats, there is no additional requirement to consult on aquatic species
11 with Fish and Wildlife Service (FWS) or National Marine Fisheries
12 Service (NMFS).
- 13 • If the action agency determines that there were adverse effects on T&E
14 species or their habitats then the action agency must consult with FWS
15 and/or NMFS, as required by 50 CFR 402.05 (Emergencies).
16 Procedures for emergency consultation are described in the *Interagency*
17 *Consultation Handbook*, Chapter 8 (March, 1998). In the case of a
18 long duration incident, emergency consultation should be initiated as
19 soon as practical during the event. Otherwise, post-event consultation is
20 appropriate. The initiation of the consultation is the responsibility of
21 the unit administrator.
- 22
- 23 • Ground application of a wildland fire chemical into a waterway also requires
24 determining whether the application has caused any adverse effects to a T&E
25 species or their habitat. The procedures identified above also apply.
- 26
- 27 • Each agency is responsible for ensuring that their appropriate agency specific
28 guides and training manuals reflect these standards.