TECHNOLOGY TRANSFER NOTE

INTERIM GUIDELINES FOR AERIAL APPLICATION OF FOAM ON FOREST FIRES

A-010

A workshop was held at the Northern Forestry Centre from November 29-December 1, 1988, at which fire management agencies served by the Northwest Region of Forestry Canada met to identify research and technology needs related to the use of foam as a suppressant in aerial wildfire control operations. A major recommendation of the participants concerned the establishment of interim guidelines for air attack officers (AAO) or birddog officers (BDO) with respect to the aerial application of foam. The guidelines presented in this *Note* were formulated by a group comprised of Forestry Canada fire researchers and fire operations personnel from the Alberta Forest Service (AFS) and the Government of the Northwest Territories' (GNWT) Department of Renewable Resources.

The guidelines were prepared based on the following considerations:

- That they only refer to the initial application of foam, due to the lack of information on "burn-thru" situations.
- Foam effectiveness is generally limited to fires or fire perimeters with flame lengths of less than 2.5 m or frontal fire intensities of about 2000 kW/m (i.e., low- to high-intensity surface fires with torching or candling).
- The availability and arrival time of ground support will alter the aerial tactics by placing different emphasis on the required effectiveness of foam.
- A very simple fuels classification scheme based on readily observable characteristics of the tree canopy (if present) and forest floor as related to the delivery and dispersion of foam properties.
- Foam consistency will be limited to three broad categories generally recognized by AAOs or BDOs (i.e., "dry", "dripping", and "wet").

Wet foam penetrates the tree canopy well and drains into the forest floor quickly. However, its presence is short lived. Dry foam on the other hand tends to be intercepted by the tree canopy. It coats and insulates well but releases water slowly. Dripping foam exhibits characteristics intermediate in performance between wet and dry foam.

The guidelines presented here reflect the current "state-of-our-knowledge". Comments are welcome. Inquiries should be directed to the first author. Plans call for an interagency evaluation team to study the operational use of foam in western and northern Canada during the 1989 fire season. These interim guidelines may well be revised as a result of their findings.

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RECOMMENDED FOAM CONSISTENCIES FOR AERIAL ATTACK[a]
(for low- to high-intensity surface fires with torching or candling)[1]

Ground Support (within 30 minutes)

TREE CANOPY	FOREST FLOOR: Shallow	FOREST FLOOR: Deep
Open	W E T (C-1,S-1,O-1)[b]	DRIPPING (C-2, S-2)[b]
Closed	DRIPPING (C-4, D-1)[b]	W E T *FOLLOWED BY* DRIPPING [i.e.,2 loads] (C-3,M-1,M-2)[b]

No Ground Support

TREE CANOPY	FOREST FLOOR: Shallow	FOREST FLOOR: Deep
Open	DRIPPING (C-1,S-1,O-1)[b]	DRY (C-2, S-2)[b]
Closed	W E T *FOLLOWED BY* D R Y optional [i.e.,2 loads] (C-4, D-1)[b]	W E T *FOLLOWED BY* D R Y [i.e.,2 loads] (C-3,M-1,M-2)[b]

[a] Foam consistencies[2] based on visibility criteria:

D R Y - visible from the air for 30+ minutes.

DRIPPING - visible from the air for 20 minutes.

W E T - visible from the air for 5 minutes.

[b] Applicable Canadian Forest Fire Behavior Prediction (FBP) System fuel types in the boreal forest[3]:

C-1: Spruce-Lichen Woodland
C-2: Boreal Spruce
C-3: Mature Jack Pine
C-4: Immature Jack Pine
D-1: Leafless Aspen
M-1: Boreal Mixedwood-leafless
M-2: Boreal Mixedwood-summer
S-1: Jack Pine Slash
S-2: Spruce-Balsam Slash
O-1: Grass

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[1] See Plates 6 and 8 of the poster "Fire Behavior in Jack Pine Stands as Related to the Canadian Forest Fire Weather Index (FWI) System" published by the Northern Forestry Centre in 1988.

[2] The three broad categories of foam consistency recognized here are related to the type-of-foam classification (i.e., scale of 1 to 5 linked to foam descriptions) agreed to by participants at the International Workshop on "Foam Applications for Wildland and Urban Fire Management" held June 6-10, 1988, in Denver, Colorado. **D R Y = Foam Types 1** (mostly air; very "dry" and fluffy) and **2** (like shaving or whipped cream; holds peak; does not immediately run on vertical surfaces). **DRIPPING = Foam Type 3** (like watery shaving cream; peaks collapse; immediately, runs on vertical surfaces). **W E T = Foam Types 4** (very wet; readily runs off vertical surfaces) and **5** (mostly water, no "body").

[3] Note that photographic examples of the FBP System fuel types in Saskatchewan and Manitoba have been published in poster formats by the Canadian Forestry Service (now Forestry Canada) District Offices in Saskatchewan (1987) and Manitoba (1988).

This note, if cited, should be referred to as personal communication with the author.

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