

Chapter 14 Firefighting Equipment

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Introduction

The agency wildland fire program equipment resources include engines, dozers, water tenders, and other motorized equipment for fire operations.

Policy

Each state/region will comply with established standards for training, equipment, communications, organization, and operating procedures required to effectively perform arduous duties in multi-agency environments and various geographic areas.

Approved foam concentrate may be used to improve the efficiency of water, except near waterways where accidental spillage or over spray of the chemical could be harmful to the aquatic ecosystem, or other identified resource concerns.

Firefighting Engines

Operational Procedures

All engines will be equipped, operated, and maintained within guidelines established by the Department of Transportation (DOT), regional/state/local operating plans, and procedures outlined in *BLM Manual H-9216, Fire Equipment and Supply Management*, or agency equivalent. All personnel assigned to agency fire engines will meet all gear weight, cube, and manifest requirements specified in the *National Mobilization Guide*.

Fire Engine Staffing

An ENGB will be with every engine, and the minimum staffing is two individuals for Type 4, 5, 6, 7, engines.

For Type 3 engines, minimum staffing is three individuals, including an Engine Boss.

- *BLM* - For *BLM* engine staffing requirements see Chapter 2.
- *FWS* - Minimum staffing for Type, 6 and 7 engines (on Refuge lands) is one *ENOP* and one *FFT2*. A minimum of one *ICT5* must be available on the engine crew.
- *NPS* - For *NPS* engine staffing requirements see Chapter 3.
- *FS* - A Single Resource Boss may supervise a type 6 or 7 engine.

1 Engine Typing

2 Engine Typing and respective standards are identified in the *NWCG Fireline Handbook, 410-1*.

- 3
4 • **FS** - See <http://www.fs.fed.us/fire/equipment/engine-models/models.html> for
5 description of Forest Service national engine standards.

6

7 Driving Standard

8 Refer to driving standards in Chapter 07.

9

10 Engine Water Reserve

11 Engine Operators will maintain at least 10 percent of the pumpable capacity of
12 the water tank for emergency engine protection and drafting.

13

14 Chocks

15 At least one set of wheel chocks will be carried on each engine and will be
16 properly utilized whenever the engine is parked or left unattended. This
17 includes engine operation in a stationary mode without a driver "in place."

18

19 Fire Extinguisher

20 All engines will have at least one 5 lb. ABC rated (minimum) fire extinguisher,
21 either in full view or in a clearly marked compartment.

22

23 Nonskid Surfaces

24 All surfaces will comply with National Fire Protection Association (*NFPA*)
25 *1906 Standard for Wildland Fire Apparatus* requirements.

26

27 First Aid Kit

28 Each engine shall carry, in a clearly marked compartment, a fully equipped 10-
29 person first aid kit.

30

31 Gross Vehicle Weight (GVW)

32 Each engine will have an annually certified weight slip in the vehicle at all
33 times. Weight slip will show individual axle weights and total GVW. Operators
34 of engines and water tenders must ensure that the maximum certified gross
35 vehicle and axle weight ratings are never exceeded, including gear, personnel
36 and fuel. The NFPA 1906 standard of 270 pounds per seat position for each
37 person and their personal gear will be used to calculate the loaded weight.

- 38 • **FS** - Refer to *FSH 7109.19, Chapter 30* for calculation of *Rough Road*
39 *Factor reduction for driving on rough or unsurfaced roads*.

- 40 • **NPS** - A copy of the annual certified weight slip must be sent to the *Fire*
41 *Equipment and Facilities Specialist at the FMPC in Boise* prior to the
42 *vehicle being put into service each season*.

43

44

1 Speed Limits

2 Posted speed limits will not be exceeded.

3

4 Lighting

5 Headlights and taillights shall remain illuminated at all times while the vehicle is
6 in motion. All new orders for fire engine apparatus will include an overhead
7 lighting package in accordance with agency standards. Lighting packages will
8 meet NFPA 1906 standards (6.8, 2006 edition). Engines currently in service
9 may be equipped with overhead lighting packages. A red, white, and amber
10 combination is the accepted color scheme for fire. Lighting packages containing
11 blue lights are reserved for law enforcement and are not allowed on fire
12 vehicles.

13

14 Emergency Light Use

15 Emergency lighting will be used only during on site wildland fire operations or
16 to mitigate serious safety hazards. Overhead lighting and other emergency
17 lighting must meet state code requirements, and will be illuminated whenever
18 the visibility is reduced to less than 300 feet.

- 19 • *DOI- See agency chapters or policy for specific guidance.*
- 20 • *FS- See FSM 5120 and 5135 for red lights and siren policy.*

21

22 Fuel Use, Storage and Transportation

23 Guidance and direction for the use, storage, and transportation of fuel can be
24 found in the *Interagency Transportation Guide for Gasoline, Mixed Gas, Drip*
25 *Torch Fuel, and Diesel* at:

26 <http://www.nwcg.gov/pms/pubs/442/pms442.pdf>

27

28 Fire Engine Maintenance Procedure and Record

29 Apparatus safety and operational inspections will be accomplished either on a
30 post-fire or daily basis. Offices are required to document these inspections.
31 Periodic maintenance (as required by the manufacturer) shall be performed at
32 the intervals recommended and properly documented. All annual inspections
33 will include a pump gallons per minute (GPM) test to ensure the pump/plumbing
34 system is operating at desired specifications.

35

36 Engine Inventories

37 An inventory of supplies and equipment carried on each vehicle is required to
38 maintain accountability and to obtain replacement items lost or damaged on
39 incidents. The standard inventory for engines is found in Appendix R

40

41 Water Tenders

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43 Water Tender Staffing Standards

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45 Water Tender (Non-Tactical)

Release Date: January 2011

- 1 • **Qualifications:** CDL (tank endorsement).
- 2 • **Staffing:** A water tender (non-tactical) may be staffed with a crew of one
- 3 driver/operator when it is used in a support role as a fire engine refill unit or
- 4 for dust abatement. These operators do not have to pass the Work Capacity
- 5 Test (WCT) but are required to take annual refresher training.

6

7 **Water Tender (Tactical)**

8 Tactical use is defined as “direct fire suppression missions such as pumping
9 hoses, live reel use, running attack, and use of spray bars and monitors to
10 suppress fires.”

- 11 • **Qualifications:** ENOP, CDL (tank endorsement)
- 12 • **Staffing:** Tactical water tenders will carry a minimum crew of two:
 - 13 ➤ One ENOP
 - 14 ➤ One Engine Module Member

15

16 **Dozers/Tractor Plows**

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18 **Dozer/Tractor Plow Training and Qualifications**

19 Agency personnel assigned as dozer/tractor plow operators will meet the
20 training standards for a Firefighter 2 (FFT2). This includes all safety and annual
21 refresher training. While on fire assignments, all operators and support crew
22 will meet PPE requirements including the use of aramid fiber clothing, hard
23 hats, fire shelters, boots, etc.

24

25 **Dozer/Tractor Plow Physical Fitness Standards**

- 26 • **BLM/NPS** - All employee dozer/tractor plow operators will meet the WCT
- 27 requirements at the Moderate level before accepting fire assignments.
- 28 • **FWS** - See the Fire Management Handbook
- 29 • **FS** - FS dozer operators refer to FSM 5134.32.

30

31 **Dozer/Tractor Plow Operational Procedures**

- 32 • Agency owned and operated dozer/tractor plows will be equipped with
- 33 programmable two-way radios, configured to allow the operator to monitor
- 34 radio traffic.
- 35 • Agency dozer/tractor plows with non-red carded operators and all contract
- 36 dozer/tractor plows will have agency supplied supervision when assigned to
- 37 any suppression operations.
- 38 • Contract or offer-for-hire dozers must also be provided with radio
- 39 communications, either through a qualified dozer/tractor plow boss or an
- 40 agency-supplied radio. Contract dozer/tractor plows will meet the
- 41 specifications identified in their agreement/contract.
- 42 • Operators of dozer/tractor plows and transport equipment will meet DOT
- 43 certifications and requirements regarding the use and movement of heavy

1 equipment, including driving limitations, CDL requirements, and pilot car
2 use.

3 4 **All Terrain Vehicles (ATV)/Utility-Terrain Vehicles (UTV)**

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6 The operation of ATV/UTV can be high risk. The use of ATV/UTVs should be
7 evaluated to ensure that use is essential to accomplish the mission, rather than
8 for convenience.

9
10 Because of the high risk nature, agencies have developed specific operational
11 policy (refer to current agency policy). Common policy requirements for
12 wildland fire operations are highlighted below:

- 13 ● A JHA/RA must be completed and approved by the supervisor prior to
14 vehicle operation.
- 15 ● All personnel authorized to operate an ATV/UTV must first complete
16 agency specific or manufacturer-provided training in safe operating
17 procedures and appropriate PPE.
- 18 ● Re-evaluation/Re-certification - Operators shall be re-evaluated every three
19 years. Infrequent users (less than 16 hours of riding a year) shall have a
20 check ride prior to scheduled use of an ATV/UTV.
- 21 ● Specific authorization for ATV/UTV use is required -- all ATV/UTV
22 operations must hold a valid Motor Vehicle Operator's Identification Card,
23 OF-346 or agency equivalent.
- 24 ● ATVs can only have a single rider – passengers are prohibited even if ATV
25 is designed for two riders.
- 26 ● UTVs passengers are limited to the number of seats installed by
27 manufacturer. The operator and passenger(s) must use seatbelts while the
28 vehicle is in motion.
- 29 ● Operators must use required PPE while loading/unloading ATV/UTV.
- 30 ● Cargo loads shall be loaded and secured as to not affect the vehicle's center
31 of gravity and shall not exceed manufacturer's recommendations for
32 maximum carrying capacity.
- 33 ● When transporting external fuel containers with a UTV, a 5 lb class BC fire
34 extinguisher must be secured to the UTV.

35 36 **Required PPE includes:**

37 **ATV Head Protection for Wildland Fire Operations:**

- 38 ● ATV Helmets must meet Snell SA2005 or SA2010 certification.
 - 39 ➤ A ¾ face model meeting Snell SA2005 or SA2010 certification is
40 acceptable for use.
 - 41 ➤ Use of half "shorty" helmets requires a JHA/RA for fireline use and
42 must include justification for its use. Refer to MTDC Tech Tip
43 publication, A Helmet for ATV Operators with Fireline Duties (0651-
44 2350-MTDC).

- 1 ● UTV Head Protection – Helmets must meet DOT, ANSI Z90.1; or Snell
2 SA2005 or SA2010 unless:
- 3 ➤ UTV is used for low speeds and smooth travel surfaces, administrative
4 use (e.g., campgrounds, incident base camps) UTV operators are not
5 required to wear hardhats or helmets.
- 6 ➤ **FWS**- Refer to 243 FW 6.
- 7 ➤ UTV is equipped with approved Rollover Protection System (ROPS),
8 and:
- 9 ➤ **BLM** – *A comprehensive and properly prepared RA of the specific*
10 *conditions demonstrates no more than a medium residual risk level,*
11 *then a hard hat meeting NFPA 1977 or ANSI Z 89.1 standards may be*
12 *worn with chin straps secured in place under chin.*
- 13 ➤ **NPS** - *Approved helmets are required for UTV operations that are*
14 *rated moderate (amber) or high (red) using the "ORV Risk Assessment*
15 *Tool" included in the NPS Off-Highway Vehicle Policy*
- 16 ➤ **FWS**- *A hard hat meeting NFPA 1977 or ANSI Z 89.1 standards may*
17 *be worn with chin straps secured in place.*
- 18 ➤ **FS**- *UTV Helmet (for fire use) – Helmets must have Snell SA*
19 *certification. Wearing hardhats while driving or riding on a UTV is not*
20 *allowed.*
- 21 ● Eye protection (goggles, face shield, or safety glasses) based upon JHA/RA.
22 ➤ Eye protection is not required for a UTV equipped with an original
23 manufacturer windshield that protects the face from branches, flying
24 debris, etc., unless otherwise required by an associated industrial use
25 activity or JHA/RA.
- 26 ● If operating ATV/UTV on the fireline, the following are required:
27 ➤ Leather or leather/flame resistant combination gloves. Flight gloves are
28 not approved for fireline use.
- 29 ➤ Yellow aramid shirt
30 ➤ Aramid trousers
31 ➤ Wildland fire boots
32 ➤ **FS**- *Shirt, trousers, and gloves used by USFS personnel must meet*
33 *Forest Service specification 5100-91(shirt), 5100-92 (trousers), and*
34 *6170-5 (gloves) or be certified to the National Fire Protection*
35 *Association (NFPA) 1977, Standard on Protective Clothing and*
36 *Equipment for Wildland Fire Fighting.*
- 37 ● ATV/UTV operator shall carry a personal communication device (e.g. two-
38 way radio, cellular phone, or satellite phone).
39
- 40 All other ATV/UTV specific guidance is found in the respective agency's
41 policy:
- 42 ● **BLM** - *Refer to BLM Manual 1112-1, Chapter 27 Off-Highway Vehicles.*
43 *<http://web.blm.gov/internal/wo-700/wo740/policy.html>*

- 1 • *FWS - Employees may only get an exception to PPE requirements with*
2 *concurrency from both the Regional Heavy Equipment Coordinator and*
3 *Regional Safety Manager. Exceptions will only be granted on a case-by-*
4 *case basis. The responsible Project Leader/supervisor must submit the*
5 *request specifically describing why use of the required PPE is unnecessary*
6 *or increases the health and safety risks of operators or passengers. The*
7 *request must include a Job Hazard Assessment.*
- 8 • *NPS - Refer to Reference Manual 50B Occupational Health and Safety,*
9 *Section 6.1 Off-Highway Vehicle Safety*
10 *<http://inside.nps.gov/waso/custommenu.cfm?lv=2&prg=46&id=5898>.*

11 **Vehicle Cleaning/Noxious Weed Prevention**

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14 To reduce the transport, introduction, and establishment of noxious weeds or
15 other invasive species on the landscape due to fire suppression activities, all fire
16 suppression and support vehicles, tools, and machinery should be cleaned at a
17 designated area prior to arriving and leaving the incident. Onsite fire equipment
18 should be used to thoroughly clean the undercarriage, fender wells, tires,
19 radiator, and exterior of the vehicle. Firefighter personnel should clean personal
20 equipment, boots, clothing, etc. of weed or other invasive species materials,
21 including visible plant parts, soil and other materials as identified by the fire
22 resource advisor. The cleaning area should also be clearly marked to identify the
23 area for post fire control treatments, as needed.

24 **Incident Remote Automated Weather Stations**

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27 Incident Remote Automated Weather Stations (IRAWS – NFES 5869) are
28 readily deployable, portable weather stations that may be utilized in unprepared
29 locations to monitor local weather conditions. IRAWS are intended for use on or
30 near the fireline or at other all-risk incidents, and are installed and operated as
31 desired by Fire Behavior Analysts (FBAN) and/or Incident Meteorologists
32 (IMET) to record and distribute real time weather data.

33 National resource IRAWS systems are cached at the National Interagency Fire
34 Center (NIFC) and may be ordered through standard equipment resource
35 ordering systems. Following release from an incident, these stations must be
36 returned to the Remote Sensing/Fire Weather Support Unit (RSFWSU) at NIFC
37 for maintenance, recalibration and redeployment.

- 38 • *XXX FWS- additional information can be found in the Fire Management*
39 *Handbook, chapter 14.*

40 **Aerial Ignition Devices**

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43 Information on types of aerial ignition devices, operational guidelines and
44 personnel qualifications may be found in the *Interagency Aerial Ignition Guide*.

1 Ground Ignition Devices

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- 3 Guidance and direction for drip torches that meet interagency standards, and the
4 transportation and dispensing of drip torch fuel can be found in the *Interagency*
5 *Transportation Guide for Gasoline, Mixed Gas, Drip Torch Fuel, and Diesel* at:
6 XXX <http://www.nwec.gov/pms/pubs/442/pms442.pdf>
7 • *FS* - direction is found in *FSH 5109.32a* and *6709.11*.