

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 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 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 properly utilized whenever the engine is parked or left unattended. This 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, 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*) 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-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 times. Weight slip will show individual axle weights and total GVW. Operators of engines and water tenders must ensure that the maximum certified **XXX GVW gross vehicle and axle weight ratings are is** never exceeded, including gear, personnel and fuel. The NFPA 1906 standard of **XXX 250-270** pounds **XXX per seat position** for each person and their personal gear will be used to calculate the loaded weight.

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

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

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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 • ~~XXXDOI- See agency chapters for specific guidance. Emergency lighting~~
20 ~~may be used during a response to an incident or to mitigate serious safety~~
21 ~~hazards. If emergency lighting is to be used it must be approved by State~~
22 ~~Director and meet all state and local emergency services training and~~
23 ~~certification requirements. Overhead lighting and other emergency lighting~~
24 ~~must meet state code requirements.~~
25 • *FS - See FSM 5120 and 5135 for red lights and siren policy.*
26

27 **Fuel Use, Storage and Transportation**

28 Guidance and direction for the use, storage, and transportation of fuel can be
29 found in the ~~XXX interagency interim policy~~ *Interagency Transportation Guide*
30 *for Gasoline, Mixed Gas, Drip Torch Fuel, and Diesel* at:

31 ~~XXX~~ <http://www.fs.fed.us/t-d/fueltran/>
32 <http://www.nwcg.gov/pms/pubs/442/pms442.pdf> ~~XXX (Use t d as user and~~
33 ~~password logins)~~

34

35 **Fire Engine Maintenance Procedure and Record**

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

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1 **Engine Inventories**

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

5
6 **Water Tenders**

7
8 **Water Tender Staffing Standards**

9
10 **Water Tender (Non-Tactical)**

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

17
18 **Water Tender (Tactical)**

19 Tactical use is defined as “direct fire suppression missions such as pumping
20 hoselays, live reel use, running attack, and use of spray bars and monitors to
21 suppress fires.”

- 22 • **Qualifications:** ENOP, CDL (tank endorsement)
23 • **Staffing:** Tactical water tenders will carry a minimum crew of two:
24 One ENOP
25 One Engine Module Member

26
27 **Dozers/Tractor Plows**

28
29 **Dozer/Tractor Plow Training and Qualifications**

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

35
36 **Dozer/Tractor Plow Physical Fitness Standards**

- 37 • **XXX BLM/NPS** - All employee dozer/tractor plow operators will meet the
38 *WCT requirements at the Moderate level before accepting fire assignments.*
39 • **FWS** - See the *Fire Management Handbook*
40 • **FS** - FS dozer operators refer to *FSM 5134.32.*

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1 Dozer/Tractor Plow Operational Procedures

- 2 ● Agency owned and operated dozer/tractor plows will be equipped with
3 programmable two-way radios, configured to allow the operator to monitor
4 radio traffic.
- 5 ● Agency dozer/tractor plows with non-red carded operators and all contract
6 dozer/tractor plows will have agency supplied supervision when assigned to
7 any suppression operations.
- 8 ● Contract or offer-for-hire dozers must also be provided with radio
9 communications, either through a qualified dozer/tractor plow boss or an
10 agency-supplied radio. Contract dozer/tractor plows will meet the
11 specifications identified in their agreement/contract.
- 12 ● Operators of dozer/tractor plows and transport equipment will meet DOT
13 certifications and requirements regarding the use and movement of heavy
14 equipment, including driving limitations, CDL requirements, and pilot car
15 use.

17 All Terrain Vehicles (ATV)/Utility-Terrain Vehicles (UTV)

18
19 The operation of ATV/UTV can be high risk. ~~XXX and their use needs to be~~
20 ~~evaluated to determine if it is essential to accomplish the mission and not as a~~
21 ~~matter of convenience.~~ The use of ATV/UTVs should be evaluated to ensure
22 that use is essential to accomplish the mission, rather than for convenience.

23
24 Because of the high risk nature, agencies have developed specific operational
25 policy (refer to current agency policy). Common policy requirements for
26 wildland fire operations are highlighted below:

- 27 ● ~~XXX Specific authorization for ATV/UTV use is required.~~
- 28 ● ~~All personnel authorized to operate an ATV/UTV must first complete~~
29 ~~agency specific or manufacturers training in safe operating procedures and~~
30 ~~appropriate PPE.~~
- 31 ● ~~Re-evaluation/Re-certification—Operators shall be re-evaluated every three~~
32 ~~years. Infrequent users (less than 16 hours of riding a year) shall have a~~
33 ~~check ride prior to scheduled use of an ATV/UTV.~~
- 34 ● A JHA/RA must be completed and approved by the supervisor prior to
35 vehicle operation.
- 36 ● All personnel authorized to operate an ATV/UTV must first complete
37 agency specific or manufacturer-provided training in safe operating
38 procedures and appropriate PPE.
- 39 ● Re-evaluation/Re-certification - Operators shall be re-evaluated every three
40 years. Infrequent users (less than 16 hours of riding a year) shall have a
41 check ride prior to scheduled use of an ATV/UTV.
- 42 ● Specific authorization for ATV/UTV use is required -- all ATV/UTV
43 operations must hold a valid Motor Vehicle Operator's Identification Card,
44 OF-346 or agency equivalent.

- 1 ● ATVs can only have a single rider – passengers are prohibited even if ATV
2 is designed for two riders.
- 3 ● UTVs passengers are limited to the number of seats installed by
4 manufacturer. The operator and passenger(s) must use seatbelts while the
5 vehicle is in motion.
- 6 ● Operators must use required PPE while loading/unloading ATV/UTV.
- 7 ● Cargo loads shall be loaded and secured as to not affect the vehicle’s center
8 of gravity and shall not exceed manufacturer’s recommendations for
9 maximum carrying capacity.
- 10 ● When transporting external fuel containers with a UTV, a 5 lb class BC fire
11 extinguisher must be secured to the UTV.

12
13 **Required PPE includes:**

14 **XXX ATV Head Protection for Wildland Fire Operations:**

- 15 ● XXX ATV Helmets must meet Snell SA2005 or SA2010 certification.
16 A ¾ face model meeting Snell SA2005 or SA2010 certification is
17 acceptable for use.
18 ~~XXX ATV Helmet – For ATV use, helmets must meet DOT or Snell
19 M2005 certification. ATV Helmet – Helmets meeting DOT, ANSI 90,
20 or SNELL M 95 are required. ATV Helmets must meet Snell SA2005
21 or 2010 certification.~~
22 ~~XXX ATV/Fire Helmet – For wildland firefighters on fire line duty,
23 helmets must meet Snell SA2005 certification. XXX Helmets worn by
24 wildland firefighters on fire line duty must be lined by
25 Nomex®/Aramid type fire resistant material. A ¾ face model meeting
26 Snell SA2005 or 2010 certification is acceptable for use.~~
27 Use of half “shorty” helmets requires a JHA/RA for fireline use and
28 must include justification for its use. Refer to MTDC Tech Tip
29 publication, A Helmet for ATV Operators with Fireline Duties (0651-
30 2350-MTDC).
- 31 ● XXX UTV Head Protection – Helmets must meet DOT, ANSI Z90.1; or
32 Snell SA2005 or SA2010 unless:
33 UTV is used for low speeds and smooth travel surfaces, administrative
34 use (e.g., campgrounds, incident base camps) UTV operators are not
35 required to wear hardhats or helmets.
36 ~~XXX FWS- Refer to 243 FW 6.~~
37 UTV is equipped with approved Rollover Protection System (ROPS),
38 and:
39 ~~XXX BLM - UTV is equipped with Roll over protection system
40 (ROPS) and is operated on moderate terrain at moderate speeds then a
41 hard hat meeting NFPA 1977 and ANSI Z 89.1 standards may be worn
42 with chin straps secured in place under chin.~~

- 1 **XXX BLM** – Administrative use (low speeds on smooth travel
2 surfaces), e.g. campgrounds, base camps; UTV operators are not
3 required to wear hard hats or a helmet.
- 4 **XXX BLM** – A comprehensive and properly prepared RA of the
5 specific conditions demonstrates no more than a medium residual risk
6 level, then a hard hat meeting NFPA 1977 or ANSI Z 89.1 standards
7 may be worn with chin straps secured in place under chin.
- 8 **NPS** - Approved helmets are required for UTV operations that are rated
9 moderate (amber) or high (red) using the "ORV Risk Assessment Tool"
10 included in the NPS Off-Highway Vehicle Policy
- 11 **XXX FWS** - A hard hat meeting NFPA 1977 or ANSI Z 89.1 standards
12 may be worn with chin straps secured in place.
- 13 **XXX FS** - UTV Helmet (for fire use) – Helmets must have Snell SA
14 certification. Wearing hardhats while driving or riding on a UTV is not
15 allowed.
- 16 • Eye protection (goggles, face shield, or safety glasses) based upon JHA/RA.
17 **XXX** Eye protection is not required for a UTV equipped with an
18 original manufacturer windshield that protects the face from branches,
19 flying debris, etc., unless otherwise required by an associated industrial
20 use activity or JHA/RA.
- 21 • **XXX** if operating ATV/UTV on the fireline, the following are required:
22 Leather **XXX** gloves or leather/flame resistant combination gloves.
23 Flight gloves are not approved for fireline use.
24 Yellow aramid shirt
25 Aramid trousers
26 Wildland fire boots
- 27 **XXX FS**- Shirt, trousers, and gloves used by USFS personnel must
28 meet Forest Service specification 5100-91 (shirt), 5100-92 (trousers),
29 and 6170-5 (gloves) or be certified to the National Fire Protection
30 Association (NFPA) 1977, Standard on Protective Clothing and
31 Equipment for Wildland Fire Fighting.
- 32 • ATV/UTV operator shall carry a personal communication device (e.g. two-
33 way radio, cellular phone, or satellite phone).
- 34 • **XXX** ATV – do not carry passengers on ATVs.
- 35 • **XXX** UTV – carry no more passengers in a UTV than the number of seats
36 installed by the manufacturer. The operator and each passenger must have
37 their own seatbelt and it must be fastened at all times when the vehicle is in
38 motion.
- 39 • **XXX** Loads shall be mounted and secured as to not affect the vehicle's
40 center of gravity. See agency specific policy for hauling liquid cargo.
- 41 • **XXX** Load weights shall not exceed manufacturer's recommendations.
- 42 • **XXX** ATV/UTV loading and transport – see agency specific policy.
- 43 • **XXX** A JHA/RA must be completed and approved by the supervisor prior
44 to vehicle operation.

- 1
2 XXX All other ATV/UTV specific guidance is found in the respective agency's
3 policy:
- 4 • **BLM** - Refer to *BLM Manual 1112-1, Chapter 27 Off-Highway Vehicles*.
5 <http://web.blm.gov/internal/wo-700/wo740/policy.html>
 - 6 • **XXX FS**—Refer to *FSH6709.11*
 - 7 • **FWS** -XXX *Use of hardhats requires a JHA for fireline use and must have*
8 *Project Leader approval and include justification for its use. Refer to*
9 *MTDC Tech Tip publication, A Helmet for ATV Operators with Fireline*
10 *Duties (0651-2350 MTDC) XXX at [http://inside.nps.gov/waso/custommenu.cfm?lv=2&prg=46&id=5898](http://www.fs.fed.us/t-</i>
11 <i>d/pubs/htmlpubs/htm06512350/index.htm.. Exceptions to the above stated</i>
12 <i>policy should only be used in rare instances. Motorcycle helmets will be</i>
13 <i>used for all loading and unloading operations. Employees may only get an</i>
14 <i>exception to PPE requirements with concurrence from both the Regional</i>
15 <i>Heavy Equipment Coordinator and Regional Safety Manager. Exceptions</i>
16 <i>will only be granted on a case-by-case basis. The responsible Project</i>
17 <i>Leader/supervisor must submit the request specifically describing why use</i>
18 <i>of the required PPE is unnecessary or increases the health and safety risks</i>
19 <i>of operators or passengers. The request must include a Job Hazard</i>
20 <i>Assessment.</i>21 • NPS - Refer to <i>Reference Manual 50B Occupational Health and Safety,</i>
22 <i>Section 6.1 Off-Highway Vehicle Safety</i>
23 <a href=).*

24 25 **Vehicle Cleaning/Noxious Weed Prevention**

26
27 To reduce the transport, introduction, and establishment of noxious weeds or
28 other **XXX biological contaminants invasive species** on the landscape due to fire
29 suppression activities, **XXX all** fire suppression and support vehicles, **XXX**
30 **tools, and machinery** should be cleaned at a designated area prior to arriving and
31 leaving the incident. Onsite fire equipment should be used to thoroughly clean
32 the undercarriage, fender wells, tires, radiator, and exterior of the vehicle. **XXX**
33 **Firefighter personnel should clean personal equipment, boots, clothing, etc. of**
34 **weed or other invasive species materials, including visible plant parts, soil and**
35 **other materials as identified by the fire resource advisor.** The cleaning area
36 should also be clearly marked to identify the area for post fire control
37 treatments, as needed.

38 39 **XXX Fire Incident Remote Automated Weather Stations**

40
41 **XXX Fire Remote Automated Weather Stations (FRAWS) are portable weather**
42 **stations that pack up into a single container and may be utilized in any location**
43 **to monitor local weather conditions. FRAWS are intended for use on or near the**
44 **fireline and are rapidly relocated to points desired by Fire Behavior Analyst**

- 1 (FBAN) for real time weather data. Incident Remote Automated Weather
2 Stations (IRAWS – NFES 5869) are readily deployable, portable weather
3 stations that may be utilized in unprepared locations to monitor local weather
4 conditions. IRAWS are intended for use on or near the fireline or at other all-
5 risk incidents, and are installed and operated as desired by Fire Behavior
6 Analysts (FBAN) and/or Incident Meteorologists (IMET) to record and
7 distribute real time weather data.
- 8 National resource IRAWS systems are cached at the National Interagency Fire
9 Center (NIFC) and may be ordered through standard equipment resource
10 ordering systems. ~~XXX Maintenance and recalibration of these stations must be~~
11 ~~coordinated with the NIFC Remote Sensing/Fire Weather Support Unit~~
12 ~~(RSFWSU).~~ Following release from an incident, these stations must be returned
13 to the Remote Sensing/Fire Weather Support Unit (RSFWSU) at NIFC for
14 maintenance, recalibration and redeployment.
- 15 • ~~XXX FWS- additional information can be found in the Fire~~
16 ~~Management Handbook, chapter 14.~~

17 **Aerial Ignition Devices**

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

22 **Ground Ignition Devices**

- 24 ~~XXX~~ Guidance and direction for drip torches that meet interagency standards,
25 and the transportation and dispensing of drip torch fuel can be found in the ~~XXX~~
26 ~~*Drip Torch Fuel Transportation and Dispensing Direction Interagency*~~
27 ~~*Transportation Guide for Gasoline, Mixed Gas, Drip Torch Fuel, and Diesel*~~ at:
28 ~~XXX~~ <http://www.nwcg.gov/pms/pubs/442/pms442.pdf>
- 29 • ~~NPS – Agency direction may be found in the 04/04/03 Memorandum Y14~~
30 ~~(9560) Aerial and Ground Ignition Equipment.~~
 - 31 • ~~FWS – specific information on ignition devices may be found in the January~~
32 ~~28, 2003 Memorandum: “Direction for Use and Purchase of Aerial and~~
33 ~~Ground Ignition Equipment.”~~
 - 34 • ~~FS - direction is found in FSH 5109.32a and 6709.11.~~