

Chapter – 6 Fire Fighting Equipment

Introduction

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

BIA policy 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.

National Model 52 Wildland Engine Program

The Model 52 Wildland Engine program was created by the BIA in 1996. The objective of the program is to provide a centralized process for replacement parts refurbishing, training and fabrication of Model 52 pumping systems. Detailed information on the program can be found in the *BIA National Model 52 Wildland Engine Program Operations Guide*.

Mission/Policy

- Provide a standardized Model 52 engine for the participating Agency or Tribal organization;
- Provide an opportunity to supply trucks for Model 52 pumping systems;
- Provide refurbishment and repair services for FMPA approved number of engines;
- Provide training in the use and maintenance of the Model 52 pumping systems;
- Evaluate new equipment and Model 52 improvements to meet the wildland fire program needs; and
- Provide emergency repair or replacement for Model 52 pumping systems.

Model 52 Replacement Guidelines

BIA Model 52 replacement schedule (funding pending) is set as follows:

Model 52 Type 6	8 Years	100,000 Miles
Model 52 Type 4	12 Years	100,000 Miles

Organization

The program is organized into three geographical areas:

- Northwest Center (Missoula, MT) services the Northwest, Rocky Mountain and north half of the Pacific Region.
- Northern Center (Eagle Butte, SD) services the Great Plains and Midwest Regions.
- Southwest Center (Dulce, NM) services the Southwest, Western, Navajo, Eastern Oklahoma, and Southern Plains, Eastern and south half of the Pacific Region.

Administration

The program is administered through the Operations Group at the National Interagency Fire Center, Boise, Idaho.

A Model 52 Oversight Group has been established to plan, develop and budget for the annual operations of the program. The Group is comprised of the Model 52 Program Leads at each center and the Deputy, Fire Operations.

Trucks and fabrication orders for the Model 52 are procured nationally through the BIA-NIFC.

Emergency Repairs

Emergency fire related repairs to a BIA Model 52 pumping package will be requested through the assigned user area Model 52 Center. The request will be reviewed and approved by the Center Manager before a Service Truck is dispatched or replacement parts are sent to the requesting agency.

Non-Emergency/Non-Suppression Repairs

Non-Emergency Repairs shall be charged to the identified agency account. The account will be approved by an agency official (example; FMO, Forest Manager, Superintendent) before requested action is taken.

Authorization of account will be sent by email or signed fax identifying account and name and title of authorizing official. Initial request for all non-emergency repairs will be requested through the assigned user area Model 52 Center. The request will be reviewed and approved by the Center Manager before a Service Truck is dispatched or replacement part is mailed to the requesting agency

All Emergency and Non-Emergency repair expenditures shall be charged to an appropriate account.

Operational Procedures

All engines will be equipped, operated, and maintained within guidelines established by the DOT. All personnel assigned to agency fire engines will meet all gear weight, cube, and manifest requirements specified in the *National Mobilization Guide* (NFES 2902).

All employees driving Wildland Engines are responsible for the proper care, operation, maintenance and protection of the vehicle. The use of government owned, rented, or leased motor vehicles is for official business only. Unauthorized use is prohibited.

Engine Crew Staffing

Type 4, 5, 6 and 7 engines will have a minimum crew of two - an engine boss (ENGB) and a firefighter Type II (FFT2).

Task force engines will have an ENGB and the appropriate number of FFT2's as required by engine type. For more information refer to *NWCG Fireline Handbook, 410-1*.

Components	Wildland Engines				
	3	4	5	6	7
Tank Minimum Capacity (gal)	500	750	400	150	50
Pump (GPM) Minimum Flow	150	50	50	50	10
@ Rated Pressure (psi)	250	100	100	100	100
Hose 2 1/2"	-	-	-	-	-
1 1/2"	1000	300	300	300	-
1"	500	300	300	300	200
Master Stream 500 gpm Min.	-	-	-	-	-
Pump and Roll	Yes	Yes	Yes	Yes	Yes
Maximum GVWR (lbs)	-	-	26,000	19,500	14,000
Personnel (NWCG min.)	3	2	2	2	2

Driving Standards

Refer to Chapter 8, Motor Vehicle Policy.

Commercial Driver's License (CDL)

BIA and DOI policy requires all personnel who operate a vehicle with a Gross Vehicle Weight (GVW) over 26,000 pounds to have a valid CDL.

Casuals Hired as Drivers When Employed by BIA

Refer to Chapter 9, Business Management and Administration.

Standards for Wildland Engines

Engine Water Reserve

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

Chocks

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."

Fire Extinguisher

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

Non-Skid Surfaces

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

First Aid Kit

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

Gross Vehicle Weight (GVW)

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 gross vehicle and axle weight ratings are never exceeded, including gear, personnel and fuel.

NFPA 1906 standard, Carrying Capacity, section 5.1.2 (4) recommends fire apparatus have an estimated in service weight of 250 lbs for each seating position, and 70 lbs of personal gear for each sitting position, section 5.1.2(5).

Miscellaneous equipment allowance, section 5.1.2(8), has incorporated the following weight limits as the standard for equipment on fire apparatus with the corresponding vehicle weights:

Chassis GVRW	Equipment Weight
10,001 – 15,000	500
15,001 – 20,000	1,000
20,001 – 26,000	1,500
Greater than 26,000	2,000

Speed Limits

Posted speed limits will not be exceeded.

Lighting

Headlights and taillights shall remain illuminated at all times while the vehicle is in motion. Lighting packages will meet NFPA 1906, Standard for Wildland Fire Apparatus 2006 Edition, section 6.8.12, Color of Warning Lights, and Zone Colors as listed in section 6.8.12.1. A red, white, and yellow combination is the accepted color scheme for fire. Lighting packages containing blue lights are reserved for law enforcement and are not allowed on fire vehicles.

It is recommended all engines currently in service with lighting packages meet NFPA standards. All new vehicles with lighting packages will be required to meet the NFPA standard. Fire Management personnel may retrofit lighting packages to meet the standard.

Emergency Light Use

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

Fuel Use, Storage and Transportation

Guidance and direction for the use, storage, and transportation of fuel can be found in the *Interagency Transportation Guide for Gasoline, Mixed Gas, Drip Torch Fuel, and Diesel*, PMS-442, <http://www.nwcg.gov/pms/pubs/442/pms442.pdf>

Fire Engine Maintenance Procedure and Record

Apparatus safety and operational inspections will be accomplished either on a post-fire or daily basis. Offices are required to document these inspections. Periodic maintenance (as required by the manufacturer) shall be performed at the intervals recommended and properly documented.

Vehicle Repairs Maintenance

The cost of all vehicle repairs and maintenance is the responsibility of the individual Agency unless the damage is directly attributable to operations on a wildfire. In that case, with written documentation, approval from the host Agency (BIA, FS, BLM, NPS, and FWS), and the damages may be paid for under the wildland fire's suppression account.

Engine Inventory

An inventory of supplies and equipment carried on each vehicle is required to maintain accountability and to obtain replacement items lost or damaged on incidents. The standard inventory for engines is found in **Appendix 6-1**.

Water Tenders

Water Tender Typing

Water tender typing and respective standards have been established by NWCG.

Requirements	Water Tender Type				
	Support			Tactical	
	S1	S2	S3	T1	T2
Tank Capacity (gal)	4000	2500	1000	2000	1000
Pump Minimum Flow (gpm)	300	200	200	250	250
@Rated Pressure (psi)	50	50	50	150	150
Max. Refill Time (mins)	30	20	15	-	-
Pump and Roll	-	-	-	Yes	Yes
Personnel (min)	1	1	1	2	2

Water Tender Staffing Standards

Water Tender (Non-Tactical)

Qualifications: CDL (tank endorsement).

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

Water Tender (Tactical)

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

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

Dozer/Tractor Plows

Dozer/Tractor Plow Training and Qualifications

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

Dozer/Tractor Plow Physical Fitness Standards

All employee dozer/tractor plow operators will meet the WCT requirements at the Moderate level before accepting fire assignments.

Dozer/Tractor Plow Operational Procedures

Agency owned and operated dozer/tractor plows will be equipped with programmable two-way radios, configured to allow the operator to monitor radio traffic.

Agency dozer/tractor plows with non-red carded operators and all contract dozer/tractor plows will have agency supplied supervision when assigned to any suppression operations.

Contract or offer-for-hire dozers must also be provided with radio communications, either through a qualified dozer/tractor plow boss or an agency-supplied radio. Contract dozer/tractor plows will meet the specifications identified in their agreement/contract.

Operators of dozer/tractor plows and transport equipment will meet DOT certifications and requirements regarding the use and movement of heavy equipment, including driving limitations, CDL requirements, and pilot car use.

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

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

Because of the high risk nature, each agency needs to develop a specific operational and safety policy. Common policy requirements for wildland fire operations are highlighted below:

- A Risk Assessment (RA) must be completed by Fire/Fuels Management personnel and approved by the Agency Administrator prior to ATV/UTV operations.
- All personnel authorized to operate an ATV/UTV must first complete agency specific or manufacturer/industry-provided training in safe operating procedures and appropriate PPE.
- Re-evaluation/Re-certification - Operators shall be re-evaluated every three years. Infrequent users (less than 16 hours of riding a year) shall have a check ride prior to scheduled use of an ATV/UTV. Documentation of certification/re-certification will be documented in IQCS, and printed on Red Card for wildland fire operations.

- Specific authorization for ATV/UTV use is required -- all ATV/UTV operators must hold a valid Motor Vehicle Operator's Identification Card, and ATV/UTV certification must be documented on card.
- ATV's can only have a single rider – passengers are prohibited even if ATV is designed for two riders.
- UTV's passengers are limited to the number of seats installed by manufacturer. The operator and passenger(s) must use seatbelts while the vehicle is in motion.
- Operators must use required PPE while loading/unloading ATV/UTV.
- Cargo loads shall be loaded and secured as to not affect the vehicle's center of gravity and shall not exceed manufacturer's recommendations for maximum carrying capacity.
- When transporting external fuel containers with a UTV, a 5 lb class BC fire extinguisher must be secured to the UTV.

Required PPE

ATV Head Protection for Wildland Fire Operations:

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

UTV Head Protection – Helmets must meet DOT, ANSI Z90.1; or Snell SA2005 or SA2010 unless:

- UTV is used for low speeds (< 5 mph) and smooth travel surfaces, administrative use (e.g., campgrounds, incident base camps) UTV operators are not required to wear hardhats or helmets.
- UTV is equipped with approved Rollover Protection System (ROPS).

- A comprehensive and properly prepared RA of the specific conditions demonstrates no more than a minimal risk, then a hard hat meeting NFPA 1977 or ANSI Z 89.1 standards may be worn with chin straps secured in place under chin.

Eye protection (goggles, face shield, or safety glasses) based upon RA.

Eye protection is not required for a UTV equipped with an original manufacturer windshield that protects the face from branches, flying debris, etc., unless otherwise required by an associated industrial use activity or RA.

If operating ATV/UTV on the fireline, the following are required:

- Leather or leather/flammable resistant combination gloves. Flight gloves are not approved for fireline use.
- Yellow aramid shirt
- Aramid trousers
- Wildland fire boots
- Appropriate head protection as described above
- ATV/UTV operator shall carry a personal communication device (e.g. two-way radio, cellular phone, or satellite phone).

Aerial Ignition Devices

Information on types of aerial ignition devices, operational guidelines and personnel qualifications may be found in the *Interagency Aerial Ignition Guide*, <http://www.blm.gov/nifc/st/en/prog/fire/Aviation/Airops/iaig.html>

Ground Ignition Devices

Guidance and direction for use of approved ground ignition equipment and the transportation and dispensing of drip torch fuel can be found in the *Interagency Transportation Guide for Gasoline, Mixed Gas, Drip Torch Fuel, and Diesel* at: <http://www.nwccg.gov/pms/pubs/442/pms442.pdf>.

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APPENDIX 6-1
Engine Equipment Inventory

Category	Item Description	NFES #	Type	
			3,4&5	6
Fire Tools & Equipment	McLeod	0296	1	1
	Combination Tool	0346	1	1
	Shovel	0171	3	2
	Pulaski	0146	3	2
	Backpack Pump	1149	3	2
	Fusees (case)	0105	1	½
	Foam, concentrate, Class A (5-gallon)	1145	1	1
	Chain Saw (and Chaps)		1	1
	Chain saw Tool Kit	0342	1	1
	Drip Torch	0241	2	1
	Portable Pump		*	*
Medical	First Aid Kit, 10-Person	0068	1	1
	Burn Kit		1	1
	Body Fluid Barrier Kit	0640	1	1

Category	Item Description	NFES #	Type	
			3,4&5	6
General Supplies	Flashlight, general service	0069	1	1
	Chock blocks		1	1
	Tow Chain or Cable	1856	1	1
	Jack, hydraulic (comply w/ GVW)		1	1
	Lug Wrench		1	1
	Pliers, fence		1	1
	Food (48 hour supply)	1842	1	1
	Rags	3309	*	*
	Rope/Cord (feet)		50	50
	Sheeting, plastic, 10' x 20'	1287	1	1
	Tape, Duct	0071	1	1
	Tape, filament (roll)	0222	2	2
	Water (gallon/person) minimum		2	2
	Bolt Cutters		1	1
	Toilet Paper (roll)	0142	*	*
	Cooler or Ice Chest	0557	*	*
	Hand Primer, Mark III	0145	*	*
	Hose Clamp	0046	2	2
	Gaskets (set)		1	1
	Pail, collapsible	0141	1	1
Hose Reel Crank		*	*	

Category	Item Description	NFES #	Type	
			3,4&5	6
Safety	Fire Extinguisher	2143	1	1
	Flagging, lime green (roll)	0258	*	*
	Flagging, yellow w/black stripes (roll)	0267	*	*
	Fuel Safety Can (OSHA, metal 5 gallon)	1291	*	*
	Reflector Set		*	*
Vehicle & Pump Support	General Tool Kit (5180-00-177-7033/GSA)		1	1
	Oil, automotive, quart		4	2
	Oil, penetrating can		1	1
	Oil, automatic transmission, quart		1	1
	Brake Fluid, pint		1	1
	Filter, gas		1	1
	Fan belts		1	1
	Spark plugs		1	1
	Hose, air compressor w/ adapters		1	0
	Fuses (set)		1	1
	Tire Pressure Gauge		1	1
	Jumper Cables		1	1
	Battery Terminal Cleaner		*	*
	Tape, electrical, plastic	0619	1	1
	Tape, Teflon		1	1
Radio	Portable		1	1
	Mobile		1	1
	Batteries (for portable radio)		2	2

Category	Item Description	NFES #	Type	
			3,4&5	6
Personal Gear (Extra Supply)	File, mill bastard	0060	*	*
	Head Lamp	0713	1	1
	Hard Hat	0109	1	1
	Goggles	1024	2	2
	Gloves		*	*
	First Aid Kit, individual	0067	1	1
	Fire Shirt		*	*
	Fire Shelter w/case & liner	0169	2	1
	Packsack	0744	2	1
	Batteries, headlamp (pkg)	0030	6	4
	Ear Plugs (pair)	1027	3	3
	Dust Mask	0131	6	4
Hose	Booster (feet/reel)	1220	100	100
	Suction (length, 8' or 10')		2	2
	1" NPSH (feet)	0966	300	300
	1½ " NH (feet)	0967	300	300
	¾ " NH, garden (feet)	1016	300	300
	1½ " NH, engine protection (feet)		20	20
	1½ " NH, refill (feet)		15	15

Category	Item Description	NFES #	Type	
			3,4&5	6
Nozzle	Forester, 1" NPSH	0024	3	2
	Adjustable, 1" NPSH	0138	4	2
	Adjustable, 1½ " NH	0137	5	3
	Adjustable, ¾" NH	0136	4	2
	Foam, ¾" NH	0627	1	1
	Foam, 1½ " NH	0628	1	1
	Mopup Wand	0720	2	1
	Tip, Mopup Wand	0735	4	2
	Tip, forester nozzle, fog	0903	*	*
	Tip, forester nozzle, straight stream	0638	*	*
Wye	1" NPSH, Two-Way Gated	0259	2	1
	1½ " NH. Two-Way Gated	0231	4	2
	¾" NH w/Ball Valve, Gated	0739	6	4
Adapters	1" NPSH-F to 1" NH-M	0003	1*	1*
	1" NH-F to 1" NPSH-M	0004	1	1
	1½ " NPSH-F to 1½ " NH-M	0007	1	1
	1½ " NH-F to NH-F to 1 ½ " NPSH-M	0006	*	*
Inceasers	¾" NH-F to 1" NPSH-M	2235	1	1
	1" NPSH-F to 1½ " NH-M	0416	2	1
Coupling	1" NPSH, Double Female	0710	1	1
	1" NPSH, Double Male	0916	1	1
	1½" NH, Double Female	0857	2	2
	1½" NH, Double Male	0856	1	1
Reducer/ Adapters	1" NPSH-F to ¾" NH-M	0733	3	3
	1½" NH-F to 1" NPSH-M	0010	6	4
	2" NPSH-F to 1½" NH-M	0417	1	1
	2½" NPSH-F to 1½" NH-M	2229	*	*

Category	Item Description	NFES #	Type	
			3,4&5	6
Reducer	1½" NH-F to 1" NH-M	0009	1	1
	2.5" NH-F to 1½" NH-M	2230	1	1
Tee	1" NPSH-F x 1" NPSH-M x 1" NPSH-M w/cap	2240	2	2
	1½" NH-F x 1½" NH-M x 1" NPSH-M w/cap	0731	2	2
	1½" NH-F x 1½" NH-M x 1" NPSH-M w/valve	0230	2	2
Valve	1½" NH-F, Automatic Check and Bleeder	0228	1	1
	¾" NH, Shut Off	0738	5	5
	1" Shut Off	1201	1	1
	1½" Shut Off	1207	1	1
	Foot w/strainer		1	1
Ejector	1" NPSH x 1½" NH x 1½" NH, Jet Refill	7429	*	*
Wrench	Hydrant, adjustable, 8"	0688	1	1
	Spanner, 5", 1" to 1½" hose size	0234	4	1
	Spanner, 11", 1½" to 2½" hose size	0235	2	2
	Pipe, 14"	0934	1	1
	Pipe, 20"		1	1

Category	Item Description	NFES #	Type	
			3,4&5	6
Engine	Fireline Handbook	0065	1	1
	Belt Weather Kit	1050	1	1
	Binoculars		1	1
	Map Case w/map		1	1
	Inventory List		1	1
	Standards for Fire and Aviation Operations		1	1

* No minimums - carried by engine as an option, within weight limitations.