

Student Workbook SW1

Issued To _____

WRITTEN AND PRACTICAL EXERCISES FOR USE WITH

Basic Brushfire operations



This Student Workbook Is Compatible With ARIZOFT Courses FSCBL1 and PPP-1



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Software

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Basic Brushfire Operations

Introduction

Student Workbook SW1 is designed to accompany Arizoft courses FSCBL1 and/or PPP-1, Basic Brushfire Operations. These courses are designed to familiarize personnel having little or no firefighting experience with the safety precautions, equipment, and tactics used by fire departments to mitigate brush fires. It is not an adequate substitute for a Basic Wildland Fire Fighter course meeting the standards of NFPA standard 1051, Professional Qualifications for Wildland Firefighters. Arizoft Software and Geoffrey T. Bohrer assume no liability for the conduct of individuals, either on or off the fireground, and by installing or viewing these materials, you agree to release Arizoft Software and Geoffrey T. Bohrer from any liability arising from injury, malpractice, or misconduct on or off the fireground.

This Student Workbook is provided for your convenience in using Basic Brushfire Operations. We suggest two ways of using this Student Workbook:

1. Use the Student Workbook as an outline for note-taking while viewing Basic Brushfire Operations.
2. Complete the questions for each chapter after viewing to test your learning progress and retention.

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THE TEN STANDARD FIRE ORDERS

Fight fire aggressively but provide for safety first.

Initiate all action based on current and expected fire behavior.

Recognize current weather conditions and obtain forecasts.

Ensure instructions are given and understood.

Obtain current information on fire status.

Remain in communication with crew members, your supervisor, and adjoining forces.

Determine safety zones and escape routes.

Establish lookouts in potentially hazardous situations.

Retain control at all times.

Stay alert, keep calm, think clearly, act decisively.

Common Denominators of Fire Behavior on Tragedy Fires

1. Most incidents occur on smaller fires or on isolated portions of larger fires.
2. Most fires are innocent in appearance before the flareups or blowups. In some cases, tragedies have occurred during the mopup phase.
3. Flareups generally occur in deceptively light fuels.
4. Fires run uphill surprisingly fast in chimneys, gullies, and on steep slopes.
5. Some suppression tools, such as helicopters and air tankers, can adversely affect fire behavior. The blasts of air from low-flying helicopters and air tankers have been known to cause flareups.

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WATCH OUT Situations

*(Note: these are not prohibited situations. Sometimes, the needs of the suppression effort or unexpected fire behavior will put you in these situations. However, each of these conditions has, in the past, contributed to a fire tragedy. If you should find yourself in one of these situations, you should increase your alertness level, and be prepared to evacuate or take other steps to ensure your safety. These are the situations that yell **WATCH OUT!**)*

1. Fire not scouted and sized-up
2. In terrain not seen by daylight
3. Safety zones and escape routes not identified
4. Unfamiliar with weather and local factors affecting fire behavior
5. Uninformed on strategy, tactics, and hazards
6. Instructions or assignments not clear
7. No communications with crew members or supervisor
8. Constructing fireline without a safe anchor point
9. Building fireline downhill with fire below
10. Attempting frontal assault on fire
11. Unburned fuel between you and the fire
12. Cannot see main fire, not in contact with anyone who can
13. On a hillside where rolling material can ignite fuel below
14. Weather becoming hotter and drier
15. Wind increases and/or changes direction
16. Getting frequent spot fires across line
17. Terrain and fuels make escape to safety zones difficult
18. Taking a nap near the fireline

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WATCH OUT Situations
For Wildland/Urban Interface Fires

*(Note: these are not prohibited situations. Sometimes, the needs of the suppression effort or unexpected fire behavior will put you in these situations. However, each of these conditions has, in the past, contributed to a fire tragedy. If you should find yourself in one of these situations, you should increase your alertness level, and be prepared to evacuate or take other steps to ensure your safety. These are the situations that yell **WATCH OUT!**)*

1. Poor access and narrow one-way roads
2. Bridge weight restrictions limit access
3. Wood structure construction, wood shake roofs, and wood siding
4. Inadequate water supply
5. Natural fuels within 30' of structures or vehicles
6. Extreme fire behavior
7. Strong winds
8. Civilian panic and traffic

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Written Exercises

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Questions for Introduction:

1. Fires occurring in places where structures are being built in what was previously open land are said to be located in the _____.

2. If your department's policy is different from the practices presented in this program, which should you follow? _____

3. Name three parts of a brush or wildland fire:

- A. _____
- B. _____
- C. _____

4. Any place that _____ can be used as an anchor point.

5. Write the number of the corresponding term next to the given definition:

- | | |
|---|-----------------|
| A. May be used as an anchor point _____ | 1. Anchor Point |
| B. Contains unburned fuel _____ | 2. The black |
| C. Contains no burnable fuel _____ | 3. The green |

6. An exposure is _____ if the fire will damage or destroy it in a short time given current fire behavior.

7. A _____ exposure is one that the fire could damage or destroy given a longer time frame, _____, or the loss of resources available to the firefighting effort.

8. Identify three ways of protecting exposures:

- A. _____
- B. _____
- C. _____

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Questions for Chapter 1:

1. Name three items of Personal Protective equipment for fighting brush fires:

- A. _____
- B. _____
- C. _____

2. Boots for fighting brush fires should be at least _____ inches tall.

3. Outerwear used on a brushfire should be flame-_____.

4. Always wear a helmet, eye protection, and _____ gloves while fighting brush fires.

5. A _____ is made of aluminized cloth and designed to reflect radiant heat from your body during a fire entrapment.

6. The behavior of a brush fire depends on _____, _____, and _____.

7. The most important factor in predicting the behavior of a brushfire is probably _____.

8. Name two hazards posed by thunderstorms on a brushfire scene:

- A. _____
- B. _____

9. The amount of water contained in fuel is called _____.

10. LCES stands for _____, _____, _____, and _____.

10. Burning tree limbs can create _____.

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Questions for Chapter 1 (continued):

11. A _____ is an area clear of any combustible fuels which can provide protection from a fire.

12. Always _____ when responding to an emergency scene.

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Questions for Chapter 2:

1. Most local-jurisdiction brush fires are fought using _____, _____, and _____.

2. Match the hand tool to its definition:

- | | |
|------------------------|---|
| A. McLeod _____ | 1. Holds 5 gallons of water |
| B. Backpack Pump _____ | 2. Spade-shaped with sharp edges |
| C. Pulaski _____ | 3. Used to smother fires in grass |
| D. Fire Shovel _____ | 4. Combination axe and mattock tool |
| E. Swatter _____ | 5. Has rake-like tines and a cutting edge |

3. Match the truck type to its definition:

- | | |
|------------------------|---|
| A. Type 3 Engine _____ | 1. Has minimum tank capacity of 200 gallons |
| B. Water Tender _____ | 2. Minimum crew of 3 |
| C. Type 6 Engine _____ | 3. Holds 1000 or more gallons of water |

4. Pumps are used to _____.

5. To start a gasoline-powered pump, you usually need to open the _____ before pressing the starter switch.

6. Gasoline powered pumps mounted inside the vehicle chassis are usually controlled from _____.

7. Before engaging a PTO-powered pump, ensure that the transmission is in _____.

8. With most PTO-powered pumps, it is important to _____ to keep the pump cool.

9. Water is carried to the fire and applied using _____ and _____.

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Questions for Chapter 2 (continued):

10. Describe one advantage of hard booster line.

11. Describe one advantage of CJRL handline:

12. What kind of hose is the better choice for a stationary hose lay?

13. A combination nozzle can produce either a _____ of widely spaced droplets or a _____.

14. What is the difference between a high-expansion and a medium-expansion foam nozzle?

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Questions for Chapter 3:

1. A fire may be attacked _____ or _____.
2. _____ is responsible for choosing the tactics and methods by which a fire will be attacked.
3. A _____ generally involves one firefighter driving the truck while another walks alongside, using the hose on the fire.
4. A _____ is generally used to directly attack fires in terrain inaccessible to the truck.
5. _____ occurs when the water applied to the fuel evaporates and the fuel heats back up to ignition temperature.
6. An _____ is used when conditions make a direct attack either unsafe or impractical.
7. Match the indirect attack method to its definition:

| | |
|---------------------------|--|
| A. Wetlining _____ | 1. Removing fuel from the path of the fire |
| B. Cutting handline _____ | 2. Applying water or foam to the fuel |
| C. Backfiring _____ | 3. Used to widen other kinds of line |
8. Backfiring is only performed _____.
9. Once the fire is knocked down, the _____ phase begins.
10. When mopping up, all _____ in the area directed by the Incident Commander should be extinguished.
11. Extreme caution should be used when attacking _____ in _____, because the action taken in mopping them up can cause branches to fall.
12. Why should hotspots closest to the perimeter be given priority when mopping up?

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Practical Exercises

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Practical Exercises for Introduction and Chapter 1:

Exercise 1-1

Task:

Identify the parts of a brush fire and exposures.

Conditions:

Given photographic or descriptive representations of one or more brush fires with one or more immediately threatened exposures and one or more potentially threatened exposures.

Standards:

The student shall correctly identify the head, heel, perimeter, and flanks of the fires. If present, the student shall identify spot fires, fingers, and an anchor point. The student shall identify the black and green areas. The student shall identify immediately and potentially threatened exposures.

Student: _____ Instructor: _____

| | Correct | Incorrect |
|---|---------|-----------|
| Identifies head | _____ | _____ |
| Identifies flanks | _____ | _____ |
| Identifies heel | _____ | _____ |
| Identifies perimeter | _____ | _____ |
| Identifies spot fire* | _____ | _____ |
| Identifies finger* | _____ | _____ |
| Identifies anchor point* | _____ | _____ |
| Identifies black | _____ | _____ |
| Identifies green | _____ | _____ |
| Identifies immediately threatened exposure(s) | _____ | _____ |
| Identifies potentially threatened exposure(s) | _____ | _____ |
| TOTAL | _____ | _____ |

*- if not present or identifiable, award correct credit.

The student must correctly complete 7 tasks to satisfactorily complete this exercise.

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Exercise 1-2

Task:

Identify and don Personal Protective Equipment for fighting brush fires.

Conditions:

Given boots, outerwear, a helmet, eye protection, and gloves meeting the standards of the authority having jurisdiction for Personal Protective Equipment for fighting brush fires; a fire shelter if required by the standards of the authority having jurisdiction; and the policies of the authority having jurisdiction concerning Personal Protective Equipment for fighting brush fires.

Standards:

The student shall correctly identify and don each item of PPE according to the standards of the authority having jurisdiction. The student shall identify the features of each item which define it as meeting the standards.

Student: _____ Instructor: _____

Instructor: Award one point for each task correctly performed. Award 0 points for tasks incorrectly performed.

| | Identify | Don | Features | Total |
|----------------|----------|-------|----------|-------|
| Boots | _____ | _____ | _____ | _____ |
| Pants | _____ | _____ | _____ | _____ |
| Shirt | _____ | _____ | _____ | _____ |
| Helmet | _____ | _____ | _____ | _____ |
| Gloves | _____ | _____ | _____ | _____ |
| Fire Shelter | _____ | _____ | _____ | _____ |
| Eye protection | _____ | _____ | _____ | _____ |
| TOTAL | | | _____ | _____ |

Note: if fire shelter not required, award full credit. If coverall or other single-piece outerwear used, award shirt and pants credit together.

The student must be awarded 22 points to satisfactorily complete this exercise.

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Exercise 1-3

Task:

Estimate fire behavior based on weather, fuel, and topography.

Conditions:

Given a simulated brush fire in fuels and topographic conditions typically found within the student's response area and outdoor weather conditions.

Standards:

The student shall correctly identify the fuels involved in the fire, the topography in which the fire is taking place or may spread to, and the weather conditions, including wind direction and approximate force, an estimate of relative humidity, and the presence or absence of thunderstorms. The student shall identify the effect that each of these factors might have on fire behavior.

Student: _____ Instructor: _____

Instructor: Award one point for each task correctly performed. Award 0 points for incorrectly performed tasks.

| | Identify | Effect | Total |
|--------------------------------------|----------|--------|-------|
| Fuel type | _____ | _____ | _____ |
| Fuel moisture | _____ | _____ | _____ |
| Wind direction | _____ | _____ | _____ |
| Wind force | _____ | _____ | _____ |
| Relative humidity (dry or humid) | _____ | _____ | _____ |
| Presence or absence of thunderstorms | _____ | _____ | _____ |
| Topography | _____ | _____ | _____ |
| TOTAL | | | _____ |

The student must be awarded 11 points to satisfactorily complete this exercise.

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Exercise 1-4

Task:

Identify overhead and terrain hazards, safety zones, and escape routes.

Conditions:

Given a simulated brush fire at a location within the student's response area, or a photographic or descriptive representation thereof..

Standards:

The student shall correctly identify overhead hazards likely to be encountered while fighting the fire. The student shall correctly identify safety zones available to firefighters fighting the fire and escape routes available, based on terrain and an estimate of fire behavior. The student shall identify terrain hazards that may interfere with escape attempts.

Student: _____ Instructor: _____

| | Correct | Incorrect |
|-----------------------------|---------|-----------|
| Identifies overhead hazards | _____ | _____ |
| Identifies safety zone(s) | _____ | _____ |
| Identifies escape routes | _____ | _____ |
| Identifies terrain hazards | _____ | _____ |
| TOTAL | _____ | _____ |

The student must correctly complete all tasks to satisfactorily complete this exercise.

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Practical Exercises for Chapter 2:

Exercise 2-1

Task:

Identify common hand tools and their uses in fighting brush fires.

Conditions:

Given a fire shovel, a pulaski, a McLeod, a fire swatter and a backpack pump or photographic representations thereof.

Standards:

The student shall correctly identify each hand tool and verbalize its use in fighting brush fires.

Student: _____ Instructor: _____

| | Correct | Incorrect |
|---------------|---------|-----------|
| Fire shovel | _____ | _____ |
| Pulaski | _____ | _____ |
| McLeod | _____ | _____ |
| Backpack Pump | _____ | _____ |
| Fire swatter | _____ | _____ |
| TOTAL | _____ | _____ |

The student must correctly complete all tasks to satisfactorily complete this exercise.

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Exercise 2-2

Task:

Identify brush apparatus and water tenders.

Conditions:

Given brush apparatus and water tenders operated by the student's agency. If the student is a member of a larger agency divided into multiple stations or sub-units, the brush and tender apparatus operated by the student's station or subunit.

Standards:

The student shall correctly identify the apparatus by type. The student shall identify the water tenders by capacity.

Student: _____ Instructor: _____

| | Correct | Incorrect |
|----------------------------|---------|-----------|
| Identifies brush apparatus | _____ | _____ |
| Identifies water tenders | _____ | _____ |
| TOTAL | _____ | _____ |

The student must correctly complete all tasks to satisfactorily complete this exercise.

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Exercise 2-3

Task:

Identify and operate fire pumps.

Conditions:

Given a standalone gasoline-powered pump, an internally mounted gasoline powered pump, and a PTO powered pump, or photographic representations thereof, and the policies of the authority having jurisdiction concerning pump operation and maintenance.

Standards:

The student shall correctly identify, start or engage, pressurize, depressurize, and stop or disengage each pump, according to agency policy and in a manner safe to personnel and equipment. If photographic representations are used, the student shall verbalize and demonstrate starting, pressurization, depressurization, and stopping procedures.

Student: _____ Instructor: _____

Instructor: Award one point for each task correctly performed. Award 0 points for each task incorrectly performed.

| | Start | Press. | Depress. | Stop | Total |
|--------------------------|-------|--------|----------|-------|-------|
| Standalone gasoline pump | _____ | _____ | _____ | _____ | _____ |
| Internal gasoline pump | _____ | _____ | _____ | _____ | _____ |
| PTO pump | _____ | _____ | _____ | _____ | _____ |
| TOTAL | | | | _____ | _____ |

The student be awarded 10 points to satisfactorily complete this exercise.

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Practical Exercises for Chapter 3:

Exercise 3-1

Task:

Execute a rolling attack on a brush fire.

Conditions:

Given a simulated brush fire, a brush apparatus with booster line, a driver/operator, and the policies of the authority having jurisdiction concerning direct attack on brush fires.

Standards:

The student shall correctly execute a rolling attack on the simulated brush fire according to the policies of the agency.

Student: _____ Instructor: _____

| | Correct | Incorrect |
|---|---------|-----------|
| Applies sufficient water to the fire | _____ | _____ |
| Uses a 30-45 degree fog pattern | _____ | _____ |
| Maintains communication with driver | _____ | _____ |
| Watches path of truck/ eliminates potential hazards | _____ | _____ |
| Remains alert for rekindle | _____ | _____ |
| Operates in a safe manner | _____ | _____ |
| Remains in black | _____ | _____ |
| TOTAL | _____ | _____ |

The student must correctly complete all tasks to satisfactorily complete this exercise.

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Exercise 3-2

Task:

Attack a fire using a stationary hose lay.

Conditions:

Given a simulated brush fire, 100 feet of 1 ½ or 1 inch hand line with a combination nozzle, a brush apparatus, a driver/operator, and the policies of the authority having jurisdiction concerning direct attack on brush fires.

Standards:

The student shall correctly advance the hoseline to the fire and attack the fire in accordance with the policies of the agency.

Student: _____ Instructor: _____

| | Correct | Incorrect |
|--|---------|-----------|
| Advances the hoseline safely | _____ | _____ |
| Verbalizes awareness of safety zones and escape routes | _____ | _____ |
| Avoids obstacles to hoseline advancement | _____ | _____ |
| Avoids or eliminates hotspots that could threaten the hose | _____ | _____ |
| Remains in communication with driver | _____ | _____ |
| Reacts to changes in fire behavior while advancing | _____ | _____ |
| Applies sufficient water to the fire | _____ | _____ |
| Uses a 30-45 degree fog pattern | _____ | _____ |
| TOTAL | _____ | _____ |

The student must correctly complete 7 tasks to satisfactorily complete this exercise.

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Exercise 3-3

Task:

Execute an indirect attack on a brush fire.

Conditions:

Given a simulated brush fire, a brush apparatus, a driver/operator, a booster line, a hand tool, and the policies of the authority having jurisdiction concerning indirect attack techniques.

Standards:

The student shall correctly execute an indirect attack using a wetline (either water or foam is acceptable). The student shall demonstrate cutting fireline.

Student: _____ Instructor: _____

| | Correct | Incorrect |
|--|---------|-----------|
| Maintains awareness of fire behavior | _____ | _____ |
| Reacts to changes in fire behavior | _____ | _____ |
| Verbalizes awareness of safety zones and escape routes | _____ | _____ |
| Bases indirect attack on an anchor point | _____ | _____ |
| Uses sufficient water or foam in the wetline | _____ | _____ |
| Cuts fireline down to mineral soil | _____ | _____ |
| Cuts fireline twice as wide as fuel height | _____ | _____ |
| Maintains communications with team members | _____ | _____ |
| TOTAL | _____ | _____ |

The student must correctly complete 7 tasks to satisfactorily complete this exercise.

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Exercise 3-4

Task:

Execute mop-up operations.

Conditions:

Given a simulated brush fire with hot spots designated by the instructor, a brush apparatus, a driver/operator, a booster line, a hand tool, and the policies of the authority having jurisdiction concerning indirect attack techniques.

Standards:

The student shall correctly identify and extinguish hotspots in the assigned area.

Student: _____ Instructor: _____

| | Correct | Incorrect |
|--|---------|-----------|
| Identifies and extinguishes hotspots | _____ | _____ |
| Maintains awareness of fire behavior | _____ | _____ |
| Gives prio _____ | _____ | _____ |
| Bases indirect attack on an anchor point | _____ | _____ |
| Uses sufficient water or foam in the wetline | _____ | _____ |
| Cuts fireline down to mineral soil | _____ | _____ |
| Cuts fireline twice as wide as fuel height | _____ | _____ |
| Maintains communications with team members | _____ | _____ |
| TOTAL | _____ | _____ |

The student must correctly complete 7 tasks to satisfactorily complete this exercise.

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Answers for Introduction:

1. Wildland-urban interface.
2. Use the policies of your agency.
3. Any 3 of head, heel, flank, finger, spot fire, perimeter, island, origin, black, green
4. Has no combustible fuel (or variation)
5. A-2, B-3, C-1
6. Immediately threatened
7. Potentially threatened, change in fire behavior
8. Extinguishment or direct attack, remove the exposure, create conditions hostile to the fire or indirect attack

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Answers for Chapter 1:

1. Any 3 of helmet, helmet lamp, leather gloves, water, boots, eye protection, flame-resistant pants, flame-resistant shirt, flame-resistant outerwear
2. Eight
3. Leather
4. Fire shelter
5. Weather, fuel, topography
6. Wind
7. Any 2 of high winds, erratic or unpredictable fire behavior, lightning, poor visibility
8. Fuel moisture
9. Lookouts, communications, escape routes, safety zones
10. Overhead hazards
11. Safety zone
12. Obey traffic laws and signals (must specify both)

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Answers for Chapter 2:

1. Hand tools, engines, and water
2. A-5, B-1, C-4, D-3, E-2
3. A-2, B-3, C-1
4. Move water from a tank or engine to the fire (or variation)
5. Choke
6. An external panel (or variation)
7. Neutral
8. Circulate water, open tank fill and tank-to-pump valves (or variation)
9. Hoses, nozzles
10. Any 1 of allows controllable line length, easily deployed and stored, resistant to damage (or variation)
11. Any one of lighter per length, allows addition or removal of appliances (or variation)
12. CJRL hand line
13. Fog pattern, straight stream
14. High expansion foam is dry, persistent, and gives good coverage; medium-expansion foam is wetter and gives good water penetration (or variation)

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Answers for Chapter 3:

1. Directly, indirectly (or reverse)
2. The Incident Commander (officer in charge, senior officer)
3. Rolling attack (pump-and roll attack)
4. Stationary hose lay
5. Rekindle
6. Indirect attack
7. A-2, B-1, C-3
8. When directed by the Incident Commander
9. Mop-up
10. Hotspots
11. Hotspots, trees
12. Hotspots close to the perimeter are most likely to blow or roll across into unburned fuel, causing spot fires (or variation)

TRAINING RECORD

Student Name _____ Supervisor _____

Agency _____ Assignment _____

Course: Basic Brushfire Operations

| Exercise | Date Satisfactorily Completed | Trainer |
|---|--------------------------------------|----------------|
| Computer Training Program | _____ | _____ |
| Introduction Written Exercises (4 of 5 correct) | _____ | _____ |
| Chapter 1 Written Exercises (10 of 12 correct) | _____ | _____ |
| Chapter 2 Written Exercises (11 of 14 correct) | _____ | _____ |
| Chapter 3 Written Exercises (10 of 12 correct) | _____ | _____ |
| Exercise 1-1 | _____ | _____ |
| Exercise 1-2 | _____ | _____ |
| Exercise 1-3 | _____ | _____ |
| Exercise 1-4 | _____ | _____ |
| Exercise 2-1 | _____ | _____ |
| Exercise 2-2 | _____ | _____ |
| Exercise 2-3 | _____ | _____ |
| Exercise 3-1 | _____ | _____ |
| Exercise 3-2 | _____ | _____ |
| Exercise 3-3 | _____ | _____ |
| Exercise 3-4 | _____ | _____ |

By signing below, I certify that:

1. The student above named has satisfactorily completed all requirements outlined in the training program specified above, as indicated, to the best of my knowledge and belief. 2. The authority having jurisdiction over the training of the student above named has accepted the training contained in the training program specified above as satisfying the training requirements of said authority for the tasks and performance requirements addressed in the training. 3. The authority having jurisdiction over the training of the above named student releases Arizoft Software and Geoffrey T. Bohrer of any liability (without limitation) for claims or damages arising from the presentation or performance of the training recommendations contained within this training program, or for the student's subsequent performance or conduct on or off the fireground. 4. I have the authority to make such releases and statements on behalf of the authority having jurisdiction.

(Signature)

(Title)

(Date)

This

Certificate of Completion

is awarded to

in recognition of the successful completion of all course requirements for

Basic Brushfire Operations

as prescribed by

(Agency or Certifying Authority)

In witness thereto undersigned:

(Date)

(Agency Officer, Title)

Notes