WILDLAND URBAN INTERFACE (WUI)

STRUCTURE DEFENSE

OCTOBER 21, 2013

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INTRODUCTION

Wildland firefighting by itself is very challenging and adding structures and other improvements into the equation greatly increases the complexity. Over the last several decades an expansion of communities, homes and other improvements into wildland areas has created a significant challenge for the fire service agencies responsible for providing fire protection in those areas.

WUI fires often overtax the local fire agency resulting in the activation of mutual aid and automatic aid agreements to augment jurisdictional resources. Nearly every WUI fire includes responses from a variety of wildland and municipal fire agencies resulting in the need for clear text and common terminology among emergency responders. This chapter on WUI operations and structure defense is designed to provide common terminology and operating principles for statewide responders. It also includes guidelines and checklists to complement and enhance first responders differing levels of training and experience.

This document describes tactical actions that emphasize firefighter safety during structure defense assignments. Successful WUI firefighting operations are accomplished by selecting sound strategies supported by effective tactical actions that keep firefighters safe, protect the public and minimize property loss.

Firefighters can prepare themselves for structure defense activities by developing a sound understanding of the wildland structure environment, fire behavior and forecasting, the Risk Management process, tactical terms and associated tactical actions. An understanding of all these components will allow firefighters to safely mitigate the fire's impact upon the values they are charged with protecting.

LEADERS INTENT

The first and foremost intent during structure defense is to keep firefighters and the public safe. Secondly, once that safety can be ensured, then we can aggressively work towards keeping the wildland fire away from structures and communities.

The development of all strategies and tactics should utilize the risk management process to insure firefighter safety. Defending structures from a wildland fire will not be possible in every situation. Risk to firefighters, fire behavior and availability of resources will dictate the strategies that will be used.

When there is a need to engage in structure defense, firefighters will ensure that they are taking safe, appropriate, and reasonable tactical actions for which they are trained and equipped.

WILDLAND STRUCTURE ENVIRONMENT

When making decisions on structure defense, you must consider the overall environment where the structures are located. There are two basic structure environments in the wildland.

Interface – a condition where structures abut the wildland:

- There is a clear line of demarcation between the structures and the wildland fuels along roads or back fences.
- Usually identified as housing tracts or developments adjacent to a wildland area
- There is a greater potential for house to house ignition

Intermix – a condition where structures are scattered throughout a wildland area:

- There is no clear line of demarcation; the wildland fuels are continuous outside of and within the developed area.
- Each structure must be assessed independently
- Usually more complex to triage than an interface condition
- Usually more complex to defend than an interface condition
- Usually requires a higher ratio of engines to structures than an interface condition

DEFINITIONS

Safety Zone – a preplanned area of sufficient size and suitable location that is expected to protect fire personnel from known hazards without using fire shelters.

Temporary Refuge Area (TRA) – a preplanned area where firefighters can immediately take refuge for temporary shelter and short-term relief without using a fire shelter in the event that emergency egress to an established Safety Zone is compromised. Examples: lee side of structure, inside of structure, large lawn or parking area, cab of apparatus.

> NOTE: Although Safety Zones and viable Escape Routes shall always be identified in the WUI environment, they may not be immediately available should the fire behavior increase unexpectedly. Often a Temporary Refuge Area (TRA) is more accessible in the WUI environment. A TRA will provide temporary shelter and short-term relief from an approaching fire without the use of a fire shelter and allow the responders to develop an alternate plan to safely survive the increase in fire behavior.

Always have an exit strategy:

- Employ tactical maneuver to avoid heat injury, move away from the fire
- Move to a Temporary Refuge Area
- Withdraw along an Escape Route
- Move into a Safety Zone

FIRE BEHAVIOR FORECASTING

Firefighter and public safety is the first priority in every fire management activity. Using the Standard Firefighting Orders, firefighters are guided to make a fire behavior forecast that considers the fire's potential at the time of contact with the structure. If at any time the risk to firefighters is determined to be too great, an alternative action should be selected.

It is important to remember that fire conditions can change very quickly, so constant observation and reassessment is necessary; the tactic selected may need to change. Tactical maneuver or agility is essential to ensure firefighter safety.

Use standardized references to validate your fire behavior forecast:

- Incident Response Pocket Guide
- Look Up, Look Down, Look Around indicators
- Extreme Fire Behavior indicators (spotting, crowning, rate of spread)
- Campbell Prediction System (CPS)
- Know what the fire is doing at all times in order to maintain an accurate fire behavior forecast.
- Know current weather conditions and forecasts. Consider wind speed, direction, relative humidity, temperatures
- Observe current burning activity in order to predict flame length and intensity.
- Consider local weather factors and fire history
- Evaluate for wind shifts, micro-climates, weather indicators and hazards
- Evaluate surrounding fuels for type, height, continuity, and conditions

STRUCTURE DEFENSE SIZE-UP

Evaluate the location of the structure and surrounding area with the forecasted fire behavior in mind:

- Is wind and slope in alignment with topography leading to the structure?
- Where is the location of the structure on the slope; canyon bottom, mid-slope, or ridge top.
- Is the structure in or near a chute, chimney, saddle, or other topographic hazard?

STRUCTURE TRIAGE CATEGORIES

Select the appropriate structure triage category based on the forecasted fire behavior, the surrounding area terrain and any defensible space:

1. **Not-Threatened:** Safety Zone and TRA are present and construction features or defensible space make it unlikely that the structure will ignite during initial fire front contact.

2. **Threatened Defensible:** Safety Zone and TRA are present and construction features, lack of defensible space, or other challenges requires firefighters to implement structure defense tactics during fire front contact.

3. **Threatened Non-Defensible:** Either there is no Safety Zone or TRA present and/or the structure has challenges that do not allow firefighters to safely commit to stay and protect the structure during fire front contact.

STRUCTURE TRIAGE GUIDELINES

Consider the following factors during structure triage:

- Forecasted fire behavior and intensity - the greater the intensity, the greater the defensible space required.
- Safety Zones should be identified and designated based upon forecasted fire behavior.
- Temporary Refuge Areas (TRA) should be preplanned and identified in the event that emergency egress to an established Safety Zone is compromised.
- Is there adequate space to park your apparatus safely based upon forecasted fire behavior?
- Do you have adequate lookout and communication capability?
- Evaluate the proximity of the fuels and forecasted flame lengths in relation to the structure; is there defensible space?
  - What is the position of the structure on the slope relative to fire spread?
  - Avoid narrow canyon bottoms, mid-slopes with fire below, or narrow ridges near chimneys and saddles.
- Are there narrow roads, unknown bridge limits, and septic tank hazards?
- Are there ornamental plants and combustible debris next to the structure?
- Does the structure have open vents, eaves, decks, and other ember traps?
- Are there power lines adjacent to the structure?
- Is there an adequate limited water supply to support the necessary flow rates and GPM output?
- Did the property owners remain onsite?
- Does the structure have a flammable roof and/or siding (wood roof and siding and/or vinyl siding, along with inadequate defensible space, may make structure impossible to protect)?
- Is there adequate time and available resources to protect the structure (if you do not have time to position resources or there are a lack of resources, then it may be impractical to protect the structure)

STRUCTURE DEFENSE GUIDELINES

Personal Protective Equipment (PPE):

- Structure defense tactics can be undertaken utilizing standard wildland PPE.
- If the structure becomes involved in fire, and a decision is made to extinguish the fire, utilize the appropriate Structure Fire PPE including SCBA’s as required.

- **DO NOT** enter a structure to extinguish a fire inside the structure unless you are trained, equipped, and authorized.
- **DO NOT** base your decision to remain at a structure and/or the safety of your personnel on the use of SCBA's.

Equipment Placement:

- Identify Escape Routes and Safety Zones and TRA's and make them known to all personnel
- STAY MOBILE and wear all of your PPE
- Back equipment in for a quick escape
- Park in a cleared area (watch for overhead hazards)
- Protect your equipment (park behind the structure, placing the structure between equipment and fire front; be aware of spot fires occurring behind you)
- Watch for hazards (drop-offs, pot holes, above-ground fuel storage, chemicals, and septic tanks)
- Keep egress routes clear
- Have an engine/personnel defense line charged and readily available
- Avoid long hose lays
- Try to keep sight contact with all personnel

Water Use Guidelines:

- Keep at least 100 gallons of water reserve in your tank
- Top off your tank at every opportunity, use a garden hose
- Draft from a swimming pool, hot tub, or fishpond
- Stay mobile. Be aware that hydrants may not always work if the system is electrically powered and power is lost in the area
- Conserve water, avoid wetting down an area
- Apply water only if it controls fire spread or significantly reduces the heating of the structure being protected
- Keep fire out of the heavier fuels
- Extinguish fire at its lowest intensity, not when it is flaring up
- Knock down fire in the lighter fuels
- Have enough water to last for the duration of the main heat wave and to protect personnel

Class A Foam/Gel Use Guidelines:

- Direct Attack with Class A Foam – apply to the base of flame
- Apply Class A Foam to structure (roof and siding) 10-15 minutes before fire arrives
- Foam or gel the structure and the vegetation immediately surrounding the structure

Preparing the Structure:

- Determine if residents are home. If so, advise them to leave.
- For roof access, place the owner's ladder at a corner of the structure on the side with the least fire threat and away from the power drop.

- Clear the area around above-ground fuel tanks, shutting off tanks
- Place combustible outside furniture inside the structure
- Close windows and doors, including garage, leaving unlocked
- Remove combustibles immediately next to the structure and scatter firewood
- Construct a fire line around out-buildings, power poles and fuel tanks
- Remove vegetation from the immediate area of the structure
- Have garden hose(s) charged and placed strategically around structure for immediate use
- MAY USE THE STRUCTURE AS A TEMPORARY REFUGE AREA (TRA)

STRUCTURE DEFENSE STRATEGIES

The IC or Operations Section Chief (when assigned) is responsible for establishing the strategy. The strategy should reflect a "general" plan that is broad in scope and provides direction for accomplishing the incident objectives. For example, the strategy for protecting structures on the right flank of a wildland urban interface fire (WUI) may be to keep the fire away from homes using a coordinated direct attack with aircraft, dozers and crews. At the same time the strategy for controlling the left flank on the same fire may be to develop an indirect attack, utilizing a small task force to burn out along a series of small dirt roads and create a line that will stop the fire from spreading. The strategy must reflect a realistic approach for meeting the objectives for all portions of the fire.

The strategy must take into consideration the numbers and types of resources necessary to accomplish the incident objectives and the reflex time it will take to have them in position. A strategy that requires a large number of resources to execute the plan will fail if the needed resources cannot arrive in a timely fashion.

The strategy is also subject to change due to changes in weather, fire behavior, resource availability and any change with the objectives. For example, firefighters planning to burn out from a road system a mile from the fire front may be forced to change to a direct suppression strategy if a forecast calling for cool weather with accompanying moisture is predicted to arrive before the burnout can be executed.

STRUCTURE DEFENSE TACTICS

Where the strategy gives firefighters a general plan, tactics are the specific actions firefighters will take to accomplish the incident objectives. The choice of which tactic to use can come in the form of direction from the IC or the Operations Section Chief or it may be a decision made by the unit or resource supervisor.

The chosen tactical action must be capable of stopping the advance of the fire or preventing the fire from damaging property and doing so without incurring injuries to firefighting personnel. This means that when choosing a tactical action or when making a tactical plan it is very important to know what the fire behavior will be at the time firefighters engage the fire.

Making an accurate fire behavior forecast in advance of the fires arrival is the wildland firefighter's greatest challenge. An accurate fire behavior forecast is difficult to make with absolute certainty, but it serves as the basis for determining if a tactical action will be effective and safe.

Recognizing that there is always the potential for error in our fire behavior forecast means that we must compensate for the uncertainties by having alternative actions (tactical maneuver) built into the plan. The key point here is to never get locked into a single plan of action.

TACTICAL MANEUVER

Tactical maneuver implies movement or purposeful reaction to change. Tactical maneuver builds *agility* into a tactical plan by allowing resources to work and move around in a hazardous environment without injury, while remaining effective. Tactical maneuver is most effective when potential changes to the primary plan have been identified and fire fighter's reactions to those changes are planned out.

Firefighters must be prepared to utilize tactical maneuver when changing from structure defense mode (defensive) to suppression mode (offensive) when fire behavior allows. It is imperative to take advantage of situations that allow for firefighters to take perimeter control actions and suppress the fire.

Tactical planning must be developed in conjunction with anticipated changes in the fire environment, or fire behavior. Tactical maneuver (*agility*) is essential to ensure fire fighter safety since legitimate Safety Zones are not always immediately present in the WUI.

Firefighters should focus on *agile tactical solutions* to unanticipated changes as opposed to a rigid and inflexible siege approach. It is imperative that contingency planning be part of every tactical plan. The tactic selected may need to change to compensate for a change in the fire's behavior. Always have a way out!

Tactical maneuver can be an offensive or defensive action. Be prepared to move decisively during lulls in fire activity or take shelter in Temporary Refuge Areas or Safety Zones when the fire is active. Examples of tactical maneuver would be an engine crew going from one structure to another, moving with the fire, or staying behind a house when the fire is hitting hard and moving into full suppression mode when the fire subsides. This requires a continuous assessment of the fire and it's potential. Crews must continually identify Temporary Refuge Areas and Escape Routes to Safety Zones.

STRUCTURE DEFENSE TACTICAL ACTIONS

After making a fire behavior forecast and triaging the assigned structures, responders must now implement the necessary tactics to defend the structure from the advancing fire front. Supervisors must keep in close communication with those they supervise and adjoining forces in the area. The following are the seven tactical actions available to structure defense resources:

- **CHECK AND GO**
- **PREP AND GO**
- **PREP AND DEFEND**
- **FIRE FRONT FOLLOWING**
- **BUMP AND RUN**
- **ANCHOR AND HOLD**
- **TACTICAL PATROL**

CHECK AND GO - a rapid evaluation to check for occupants requiring removal or rescue:

- Structure Triage Category – Threatened Non-Defensible
- This tactic is most appropriate when there is no Safety Zone or TRA present and the forecasted fire spread, intensity, and the projected impact time of the fire front prohibit resources from taking preparation action to protect the structure.
- Complete a rapid evaluation to check for occupants at a structure, evaluate life threat and to assist in evacuation
- Used when fire spread, intensity, lack of time or inadequate defensible space prohibit firefighting resources from safely taking action to protect the home when the fire front arrives
- Evaluate the structure for follow up action when additional resources become available, the fire front passes or fire behavior intensity is reduced

PREP AND GO - implies that some preparation of the structure may be safely completed prior to resources leaving the area:

- Structure Triage Category – Threatened Non-Defensible
- A tactic used when a Safety Zone and TRA are not present and/or when fire spread and intensity are too dangerous to stay in the area when the fire front arrives, but there is adequate time to prepare a structure for defense ahead of the fire front.
- Utilized for structures where potential fire intensity makes it too dangerous for fire resources to stay when the fire front arrives
- There is some time to prepare a structure ahead of the fire; resources should engage in rapid, prioritized fire protection preparations and foam the structure prior to leaving
- Resources should leave with adequate time to avoid the loss of Escape Routes
- Advise residents to leave and notify supervisors of any residents who choose to stay so that you can follow-up on their welfare after the fire front passes
- As with Check and Go, Prep and Go is well suited for engine strike teams and task forces.

PREP AND DEFEND - a tactic used when a Safety Zone and TRA are present and adequate time exists to safely prepare a structure for defense prior to the arrival of the fire front:

- Structure Triage Category – Threatened Defensible
- An ideal multiple resource tactic especially in common neighborhoods where efforts may be coordinated over a wide area. A tactic used when it is possible for fire resources to stay when the fire front arrives. Fire behavior MUST be such that it is safe for firefighters to remain and engage the fire

- Adequate Escape Routes to a Safety Zone must be identified. A Safety Zone or **TRA** must exist on site
- Firefighters must be vigilant to sudden changes in fire intensity and be prepared to move to the TRA or withdraw along the Escape Route to the Safety Zone
- Adequate time must exist to safely prepare the structure for defense prior to the arrival of the fire front

FIRE FRONT FOLLOWING - a follow up tactic employed when Check and Go, Prep and Go, or Bump and Run tactics are initially used:

- A tactic used to come in behind the fire front.
- This action is taken when there is insufficient time to safely set up ahead of the fire or the intensity of the fire would likely cause injury to personnel located in front of the fire
- The goal of "Fire Front Following" is to search for victims, effect perimeter control, extinguish spot fires around structures, control hot spots and reduce ember production.

BUMP AND RUN - a tactic where resources typically move ahead of the fire front in the spotting zone to extinguish spot fires and hot spots, and to defend as many structures as possible:

- Bump and Run may be effective in the early stages of an incident when the resource commitment is light and structure defense is the priority.
- Bump and Run may also be used on fast moving incidents when there are adequate resources available, but where an effort must be made to control or steer the head and shoulders of the fire to a desired end point.
- Perimeter control and structure defense preparation are secondary considerations with the Bump and Run tactic.
- Resources must remain mobile during Bump and Run and must constantly identify Escape Routes to Safety Zones and Temporary Refuge Areas as they move with the fire front.
- Bump and Run is a defensive tactic when fire front impact in the WUI is imminent and there are not enough resources to effectively take perimeter control action. It is an offensive tactic when resources are steering the head of the fire to a desirable end point.
- The tactic is useful when terrain and fuels are suitable for mobile attack.
- Fire line supervisors and Strike Team/Task Force Leaders must realize that Bump and Run places resources in front of the advancing fire front and that extreme caution should be exercised.
- Control lines in front of the fire should be identified and prepared with dozers and fire crews enabling the Bump and Run resources to direct the fire to logical end point. This is a frontal attack strategy and a watch out situation. Control lines in front of the main fire must be reinforced with retardant drops, coordinated firing operations and engine support.

ANCHOR AND HOLD:

- "Anchor and Hold" is a tactic utilizing control lines and large water streams from fixed water supplies in an attempt to stop fire spread. The goal is to extinguish structure fires, protect exposures, and reduce ember production.
- Anchor and Hold can be referred to as taking a stand to stop the progression of the fire.

- Anchor and Hold tactics are more effective in urban neighborhoods where the fire is spreading from house to house.
- Establishing an Anchor and Hold line requires considerable planning and effort and utilizes both fixed and mobile resources:
  - Fixed engines should be spotted in safe areas where they can safely withstand any fire situation.
  - Mobile engines or task forces can engage in individual structure defense actions or perimeter control and re-supply from fixed water source.
  - Mobile engines should be prepared to re-deploy to other areas should the fire escape the Anchor and Hold line.
- Ground resources, such as engine crews and fire crews should staff hose lines and be prepared to extinguish hot spots, fire perimeter, and structures.
  - Hand crew strike teams should be deployed to construct fire control lines wherever needed and conduct firing operations.

TACTICAL PATROL - a tactic where the key element is mobility and continuous monitoring of an assigned area:

- Tactical Patrol can either be initiated:
  - After the main fire front has passed and flames have subsided but when the threat to structures still remains:
    - Patrol areas where the fire has passed but the risk to structures remains from fire brands smoldering in void spaces, on roofs, in rain gutters and stored material near buildings
  - In neighborhoods away from the interface where there is predicted to be significant ember wash and accumulated ornamental vegetation:
    - The goal is to patrol areas downwind of potential ember showers
    - This tactic should be used to extinguish hot spots or secondary structure ignitions, and address safety issues such as power lines, weakened trees, and other hazards.
  - Vigilance, situational awareness and active suppression actions are a must

APPENDIX A
WILDLAND FIRE MANAGEMENT GUIDING PRINCIPLES

1. The first priority for all-risk decisions is human survival, both firefighters and the public.

2. Incident containment strategies specifically address and integrate protection of defendable improved property and wildland values.

3. Direct protection of improved property is undertaken when it is safe to do so, where there are sufficient time and appropriate resources available, and when the action directly contributes to achieving the overall incident objectives.

4. The firefighter's decision to accept direction to engage in structure defense actions is based on the determination that the property is defendable and the risk to firefighters can be safely mitigated under the current or potential fire conditions.

5. A decision to delay or withdraw from structure defense operations is the appropriate course of action when made in consideration of firefighter safety, current or potential fire behavior, or lack of defensibility of the structure or groups of structures.

6. Firefighters at all levels are responsible for making risk decisions appropriate to their individual knowledge, experience, training, and situational awareness.

7. Every firefighter is responsible for awareness of the factors that affect their judgment and the decision-making process, including: a realistic perception of their own knowledge, skills, and abilities, the presence of life threat or structures, fire behavior, availability of resources, social/political pressures, mission focus, and personal distractions such as home, work, health, and fatigue.

8. An individual's ability to assimilate all available factors affecting situational awareness is limited in a dynamic wildland and urban interface environment. Every firefighter is responsible to understand and recognize these limitations, and to decide, and act in preparation for the "worst case."

9. It is the responsibility of *every* firefighter to participate in the flow of information with supervisors, subordinates and peers. Clear and concise communication is essential to overcome limitations in situational awareness.

APPENDIX B
RISK MANAGEMENT PROCESS

Step 1 Situation Awareness

Gather Information
Objective(s)
Previous Fire Behavior
Communication
Weather Forecast
Who's in Charge?
Local Factors
Scout the Fire

Step 2 Hazard Assessment

Estimate Potential Fire Behavior Hazards
Look Up/Down/Around Indicators
Identify Tactical Hazards
Watch Outs
What other safety hazards exist?
Consider severity vs. probability.

Step 3 Hazard Control

Firefighting Orders
LCES Checklist – MANDATORY
Anchor Point
Downhill Checklist (if applicable)
What other controls are necessary?

Step 4 Decision Point

Are controls in place for identified hazards?
NO – Reassess situation YES – Next question

Are selected tactics based on expected fire behavior?
NO – Reassess situation YES – Next question

Have instructions been given and understood?
NO – Reassess situation YES – Initiate action

Step 5 Evaluate

Personnel: Low experience level with local factors?
Distracted from primary tasks?
Fatigue or stress reaction?
Hazardous attitude?
The Situation: What is changing?
Are strategy and tactics working?

APPENDIX C
LCES CHECKIST

LCES must be established and known to ALL firefighters BEFORE it's needed.

LOOKOUT(S)

- Experienced/Competent/Trusted
- Enough Lookouts at good vantage points
- Knowledge of crew locations
- Knowledge of escape and safety locations
- Knowledge of trigger points
- Map/Weather Kit/Watch/IAP

COMMUNICATIONS(S)

- Radio frequencies confirmed
- Backup procedures and check-in times established
- Provide updates on any situation change
- Sound alarm early, not late

ESCAPE ROUTE(S)

- More than one Escape Route
- Avoid steep uphill Escape Routes
- Scouted: Loose Soils/Rocks/Vegetation
- Timed: Slowest Person/Fatigue and Temperature Factors
- Marked: Flagged for day or night
- Evaluate: Escape Time vs. Rate of Spread
- Vehicles parked for escape

SAFETY ZONE(S)

- Survivable without a fire shelter
- Back into clean burn
- Natural Features: Rock Areas/Water/Meadows
- Constructed Sites: Clear Cuts/Roads/Helispots
- Scouted for size and hazards
- Upslope?
- Downwind?
- Heavy Fuels?
- Escape time and Safety Zone size requirements
- Will change as fire behavior changes
- More heat impact = Larger Safety Zone

APPENDIX D
TACTICAL ENGAGEMENT PROCESS - PACE

Structure defense firefighting in the Wildland Urban Interface (WUI) is inherently dangerous because it is primarily associated with *in-direct* firefighting. An approaching fire is a dynamic event and subject to sudden changes that can be very difficult to anticipate. Structure defense should start with a determination of the exit strategy.

In-direct firefighting safety mitigations depend on fire behavior forecasts made in advance of the fires arrival. Accurate fire behavior forecasts are difficult to make with absolute certainty and at the same time these forecasts are the crux for determining effective safety mitigations. (Tactical Refuge Areas, Escape Routes and Safety Zones)

With firefighter safety hanging in the balance of accurate fire behavior estimates that cannot be assured, it is imperative that a multi-step safety plan be established to compensate for the uncertainties.

Firefighters must anticipate the unexpected and build agility (Tactical Maneuver) into their plan with *contingency planning.* The lexicon for contingency planning is PACE:

P - Primary Plan [Offense]
Is focused on firefighter safety
Is focused on mission objectives
Yields the most desirable results
(Manning hose lines to suppress the fire around a structure)

A - Alternate Plan [Offense]
A fallback plan that closely supports the Primary Plan
The results may be less desirable but still supports the Primary Plan
(Retreating into or behind the structure until fire intensity diminishes)

C - Contingency Plan [Defense]
A plan totally focused on the firefighter's safety
Move to a tactical refuge area (an area that provides short-term relief) or;
Withdraw along the Escape Route
Move into a Safety Zone

E - Emergency Plan [Defense]
A plan totally focused on individual firefighter survival
When threatened by fire, firefighters should get into their fire shelter:

ALWAYS HAVE A DEPLOYMENT SITE IDENTIFIED!

Implement PACE prior to engaging in any structure defense action.

P – Primary A – Alternate C – Contingency E – Emergency

APPENDIX E
LEVELS OF ENGAGEMENT - DRAW-D

As with military operations, there are FIVE Levels of Engagement in firefighting – DRAW-D. These actions apply to all aspects of wildland firefighting from the incident strategy to the individual line assignments and structure defense. They identify a thoughtful and mindful approach to choosing the appropriate tactical action. Use of DRAW-D as Levels of Engagement incorporates a “can do” attitude in every level of engagement and every level of engagement is equal in value to the overall effort as the other.

D - Defend – Holding actions, protecting priority areas
Protect the structures
Hold and improve the line

R - Reinforce – Bring more resources to bear
Add resources necessary to *advance* or *defend*

A - Advance – Anchor and Flank
Direct or indirect attack
Active burnout operations

W - Withdraw – Cease current activities until conditions modify
Abandon an established position or constructed line in response to an increase in fire intensity
Not a stigma, but a decision to move away from a threat

D - Delay – Wait until the situation has modified sufficiently to allow a different level of engagement
Waiting for conditions to meet pre-identified triggers necessary to *advance* or *defend*
Not a lack of effort, but a conscious decision to maximize long-term effectiveness

APPENDIX F
STRUCTURE ASSESSMENT CHECKLIST

Address/Property Name

- Numerical street address, ranch name, etc.
- Number of residents on site

Road Access

- Road surface (paved, gravel, unimproved, dirt)
- Adequate width, vegetation clearance and Safety Zones along road
- Undercarriage problems (4x4 access only)
- Turnouts and turnarounds
- Bridges (load limits)
- Stream crossings (approach angle, crossing depth and surface)
- Terrain (road slope, location on slope-near chimneys, saddles, canyon bottom)
- Grade (greater than 15%)

Structure/Building

- Single residence or multi-complex, out-building (barn, storage)
- Does building have unknown or hazardous materials?
- Exterior walls (stucco or other noncombustible, wood frame, vinyl, wood shake)
- Large unprotected windows facing heat source
- Proximity of any aboveground fuel tanks (LPG, propane, etc.)
- Roof material (wood shake, asphalt, noncombustible)
- Eaves (covered with little overhang, exposed with large overhang)
- Other features (wood deck, wood patio cover and furniture, wood fencing)

Clearances/Exposures/Defensible Space

- Structure location (narrow ridge, canyon, midslope, chimney)
- Adequate clearance around structure-minimum of 100 feet (steeper the slope the more clearance required)
- Surrounding fuels (larger, denser the fuels, the more clearance required)
- Flammable fuels (trees, ladder fuel, shrubs) adjacent to structure (is there time for removing these fuels?)
- Other combustibles near structure (wood piles, furniture, fuel tanks)
- Is there adequate clearance around fuel tank?
- Power lines or transformers (DO NOT park under power lines)

Hazardous Materials

- Chemicals (Look for DOT/NFPA/UN symbols)
- Pesticides and herbicides
- Petroleum products
- Paint products

Water Sources

- Hydrant/standpipe (When connecting with hydrant, be aware of flow rate and GPM output, size and venting capability of engine or water tender may not be able to handle hydrants with high flow and GPM rates.)
- Storage tank
- Swimming pool
- Hot tub
- Fish pond
- Irrigation ditch

Evacuation

- Is safe evacuation possible? (Identify safe refuge for those who cannot be evacuated.)
- Coordinate with on-scene law enforcement and emergency services personnel.

Estimated Resources for Protection

- Number(s) and type(s) of engines, water tenders, crews, dozers (General Guidelines: one engine per structure, one additional engine for every four structures to be used as “backup” and for patrol. For structures that are close together (50 feet or less), one engine may be adequate to protect two structures.)
- Type and number of aircraft available

APPENDIX G
POWERLINE SAFETY

- If there is a downed conductor on the vehicle, stay in vehicle until the power company arrives. If the vehicle is on fire or fire is near, jump clear, keep feet together and don't hang on.
- Smoke, water, and retardant are all good conductors and can cause power line-to-ground arc.
- Do not operate heavy equipment under power lines
- Do not use right-of-ways as a jump or cargo drop spot
- Do not drive with long antennas under power lines
- Do not fuel vehicles under power lines
- Do not stand near power lines during retardant drops
- Do not park under power lines
- Do not apply straight stream to power lines
- Maintain a 35 foot distance from transmission lines
- Spot fires or low ground fires can be fought with hose lines if heavy smoke or flame is not within 100 feet of the power lines
- If safe, extinguish wood poles burning at the base to prevent downed wire hazards later