Informational Summary Report of Serious or Near Serious CAL FIRE Injuries, Illnesses and Accidents

GREEN SHEET

Fire Shelter Deployment

October 25, 2019

Kincade

19-CA-LNU-019376

19-CA-LNU-019577

California Northern Region

SUMMARY

On October 25, 2019 at approximately 4:23 PM, while assigned as a Division Supervisor on the Kincade Fire, in Sonoma County, California, a CAL FIRE Fire Captain and two civilians became entrapped when their route of travel was cut off by fire. The Fire Captain defensively fired out the area and deployed a fire shelter, protecting the group from the fire's radiant heat. During the deployment, the group needed to relocate due to the changing conditions. The Fire Captain and two civilians were transported to local medical facilities to be evaluated. All three individuals were released the same day with no injuries.

Please take the Kincade Fire
Fire Shelter Deployment Survey

https://www.surveymonkey.com/r/7NJXFSM

CONDITIONS

The following overview provides a description of the fire environment leading up to and including this event that occurred on October 25, 2019.

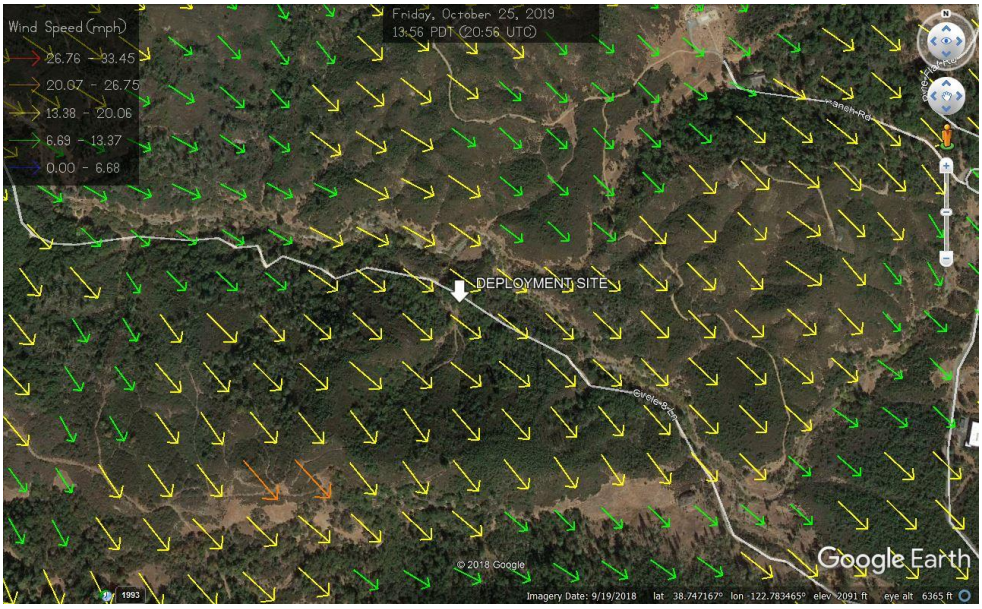
Weather

The incident area was under a Red Flag Warning on October 23, 2019 and October 24, 2019 for offshore winds as well as low humidity when the Kincade Fire started at 9:27 PM on October 23, 2019. On Friday, October 25, the general weather pattern had turned back to onshore winds as the region was bracing for a stronger offshore wind event with a forecasted Red Flag Warning during the weekend of October 26 and 27. Thus, on the day of the shelter deployment, the Kincade Fire area was in-between significant fire weather days.

The incident occurred approximately 3.5 air miles east of the Hawkeye RAWS which is a permanent RAWs weather station located at an elevation of 2,024 feet. The following weather data at the time of the shelter deployment was retrieved from this station:

- Temperature: 84° Fahrenheit
- Relative Humidity: 11%
- Winds: NW @ 12 MPH with NW gusts up to 20 MPH
- Visibility: One mile to approximately 40’ due to varying smoke accumulation.

Prior to the shelter deployment, there was a **significant directional wind change** from a westerly wind to a northerly wind. This northerly wind was in alignment with the drainage associated with the shelter deployment. At the time of the incident, the area was experiencing a northwest wind between 10 and 16 miles per hour. This flow aided in pushing the fire spread from the northwest to the southeast and up the drainage of Little Sulphur Creek.



Wind conditions near the time of the shelter deployment.

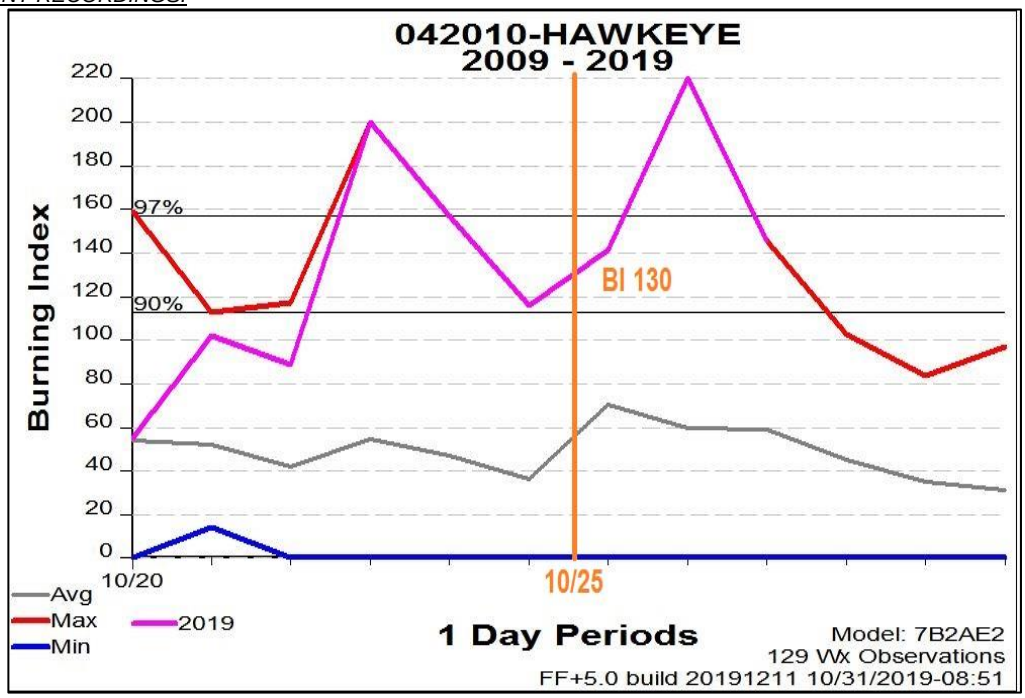
Fuels

- Fuel Types by area occupancy (%):
- SH2 (142)-Moderate Load, Dry Climate Shrub…18%
- TU5 (165)-Very High Load, Dry Climate Timber Shrub…17%
- SH7 (147)-Very High Load, Dry Climate Shrub…15%
- GS2 (122)-Moderate Load, Dry Climate Grass Shrub…15%
- GR2 (102)-Low Load, Dry Climate Grass…14%
- TL6 (186)-Moderate Load Broadleaf Litter…10%
- TL9 (189)-Very High Load Broadleaf Litter…4%
- TL3 (183)-Moderate Load Conifer Litter…4%
- Various other fuels…3%

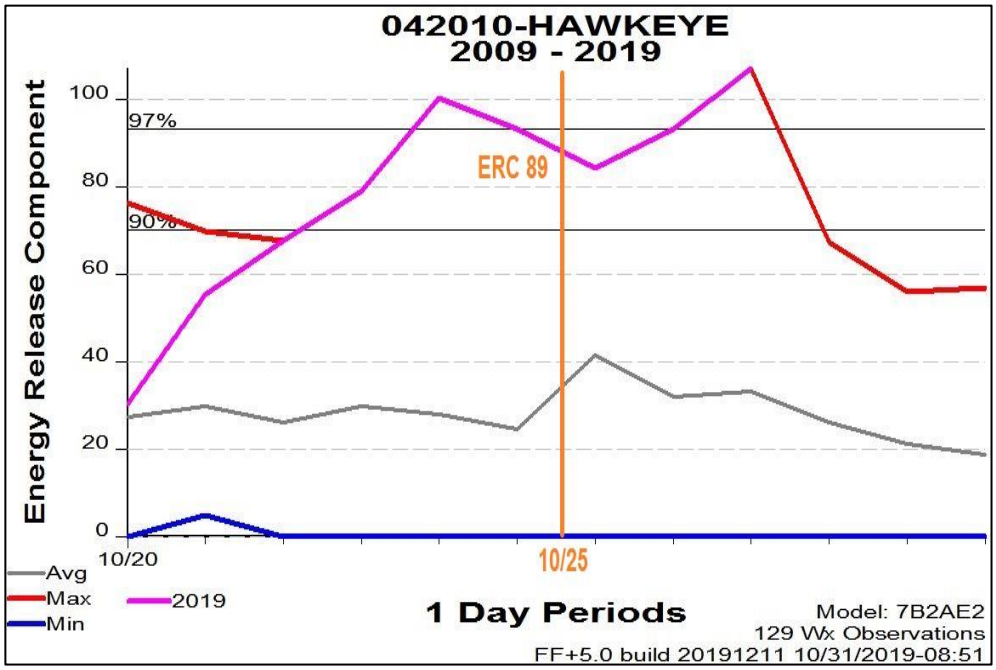
Live Fuel Moisture levels are routinely taken each month in the Geysers area near the area of origin of the Kincade Fire. For the fuels in the area, live fuel moistures of 60% and below are considered critical fuel moisture levels. On October 7, recorded fuel samples were measured at 50% indicating critical fuel moisture levels.

On the day the Kincade Fire began, the Burn Index and the Energy Release Component measured by Hawkeye RAWS were at historic levels. The following graphs display the 10-year values from October 20 through October 30 with historical highs in red, the minimum levels in blue, and the 2019 levels (October 20 through October 28) in magenta. The area where the magenta overlays the red, identifies that new historic values were being created for both indices. On October 25, both indices were recorded between the 90th and 97th percentile. This means that over 90% of the recording in the previous 10 years was under those values. The same holds true for the 97th values.

*THIS INCIDENT OCCURRED DURING THIS TIME OF RECORD SETTING BURNING INDEX AND ENERGY RELEASE COMPONENT RECORDINGS.



The Burn Index recorded from October 23 through October 28, 2019 broke the historic Burn Index Record for that respective time period at the Hawkeye RAWS.

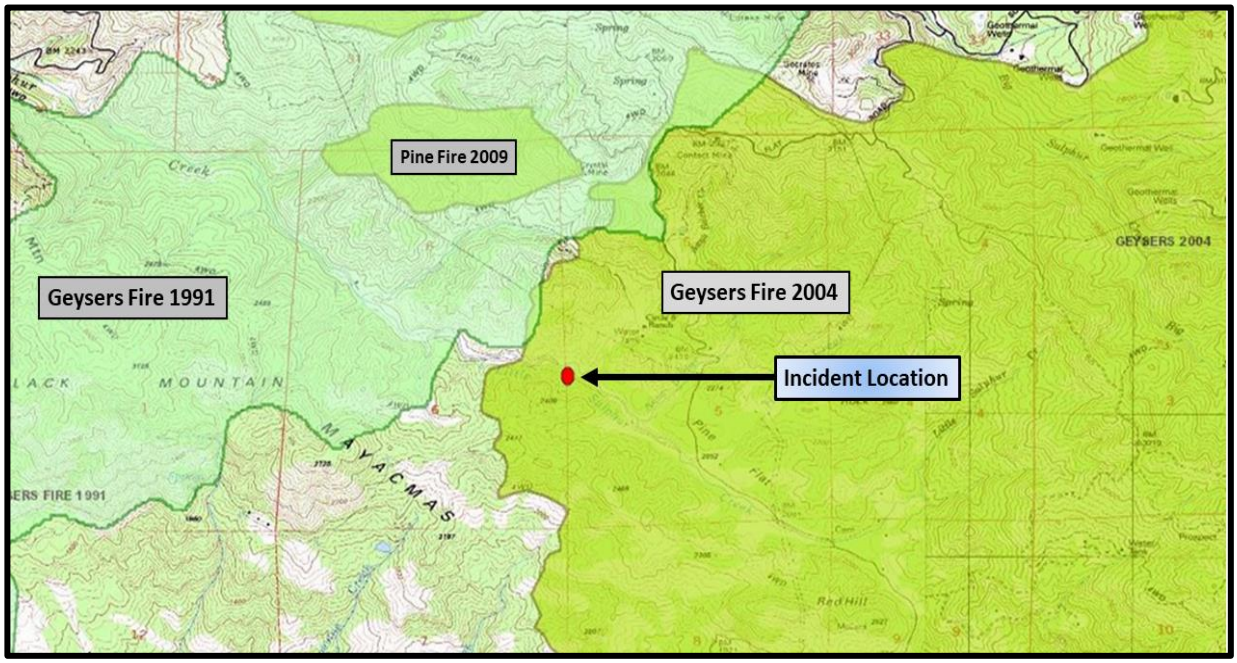


The Energy Release Component recorded from October 22 through October 28, 2019 broke the historic Energy Release Component for that respective time period at the Hawkeye RAWS.

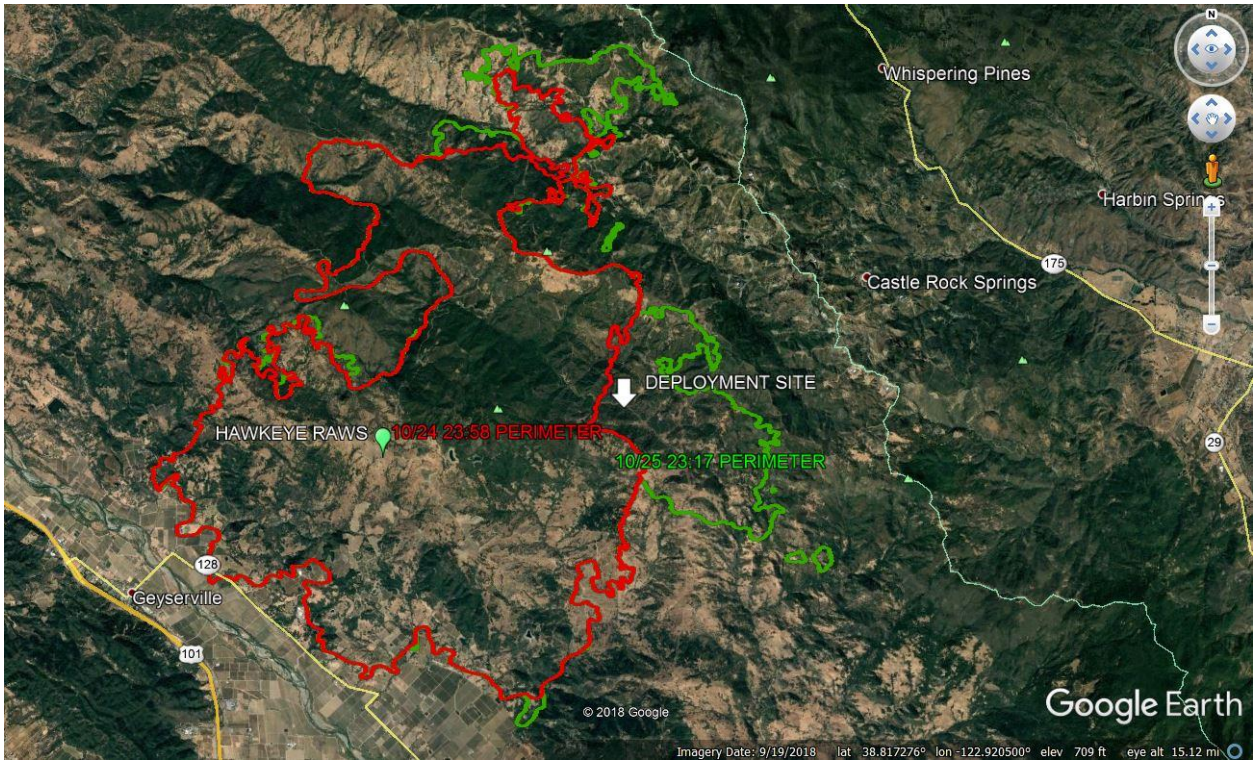
Topography
The site of the shelter deployment is located within the Coastal Mountain Range of Northern California. The existing topography provides significant canyon and slope-driven influences on local wind patterns.

- Elevation: 2,260’
- Aspect: North
- Deployment site slopes: Approximately 2% to 5%
- Adjacent slopes: Approximately 35% to 60%

Fire History
Prior to the Kincade Fire, two major fires occurred in and around the shelter deployment site in the past 30 years. Those fires included the 1991 Geysers Fire and the 2004 Geysers Fire. Vegetation re-established to a mostly continuous fuel arrangement in both of these fire areas with very little human caused fuel modifications. However, there is an area located to the southwest of the shelter deployment site that did not have any recorded fire history dating back to the 1940s.



Fire History Map displaying the Geyser Fires of 1991 and 2004 as well an area southwest of the incident site with no recorded large fire history in the prior 70 years.



Aerial image of the Kincade Fire perimeter the day before the shelter deployment.

Fire Behavior

On the morning of October 25, 2019, an inversion formed over the fire. This greatly reduced the visibility, as well as slowed fire spread. At 9:56 AM the wind was light from the south. By noon, the winds still had not changed. The light winds and effects of the inversion overhead kept the fire activity to a minimum amount of spread. By 1:56 PM, the inversion began to lift. The canyons began to receive the northwest flow through the drainages with an increase in speed.

Other Site Features

- Fire Shelter: Manufacture date – February 2004. The shelter was retrofitted with floor reinforcement in 2004.
- Make/Model of Equipment: 2008 Ford Expedition (four-wheel drive)
- Structural Features: Wood framed cabin (destroyed during this incident)
- Road Conditions: Single lane unsurfaced road

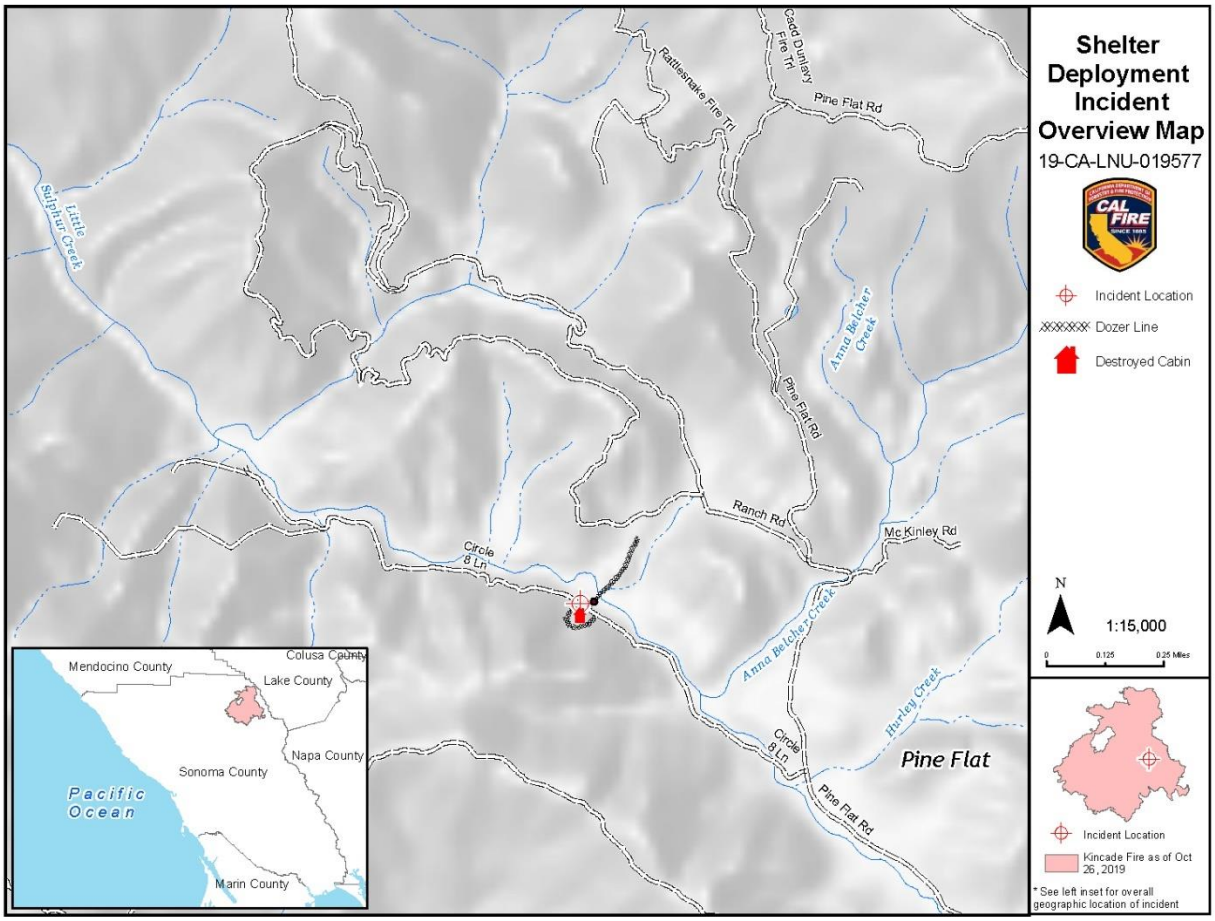
SEQUENCE OF EVENTS

On October 23, 2019, at approximately 9:24 PM, the CAL FIRE St. Helena Emergency Command Center (ECC) dispatched a vegetation fire near Burned Mountain Road and John Kincade Road in Sonoma County, California. During the night, the Kincade fire quickly spread to over 10,000 acres due to red flag weather conditions consisting of strong offshore flows, gusty winds, warm temperatures and low humidity. As the vegetation fire increased in complexity and size, a CAL FIRE Incident Management Team (IMT) was ordered and in command of the fire on October 25, 2019, at 7:00 AM. The fire had grown to 21,900 acres and destroyed multiple structures with widespread evacuations.

On October 25, 2019, at 6:00 AM, a pre-briefing for operational personnel assigned to the fire occurred at the Sonoma County Fairgrounds. In attendance was a CAL FIRE Fire Captain who was assigned as a Division Group Supervisor (DIVS1). At 7:00 AM, DIVS1 attended the operational briefing prior to driving out to the fireline. At approximately 9:30 AM, DIVS1 arrived at the Division and briefed with off-going resources.

Throughout the day, DIVS1 received additional resources. Control efforts were hampered by increasing fire activity. At approximately 3:20 PM, DIVS1 along with the Operations Section Chief, Operations Branch Director, Deputy Operations Branch Director and Division Group Supervisor Trainee (DIVS Trainee) met on Pine Flat Road to discuss tactics and develop contingency plans.

Immediately following the briefing, DIVS1 and DIVS Trainee discussed plans to use a Task Force of fire engines to protect structures scattered throughout the area. During this conversation, DIVS Trainee told DIVS1 that he heard personnel assigned to one of the Task Force engines were not wearing Nomex wildland jackets. As a result, DIVS1 began the process of locating personnel assigned to the Division to ensure all resources were wearing proper personal protective equipment.



Map 1- Overview showing incident location in relation to the Kincade Fire perimeter on October 26, 2019.

At approximately 3:45 PM, DIVS1 drove west on Circle 8 Lane; a single lane, dead-end dirt road accessed from Pine Flat Road. DIVS1 continued along Circle 8 Lane to an old cabin that was surrounded by a single blade dozer line. The cabin was situated on a small flat area flanked by steep slopes and dense vegetation. Above the cabin, a small spot fire was observed burning with low intensity approximately one-third of the way up slope. Directly east and across the drainage from this location, a high intensity fire was burning on both sides of a dozer line. The dozer line was constructed northeast from the cabin to the other side of the drainage. DIVS1 also observed increased fire activity in the drainage approaching the cabin from the west. DIVS1 did not locate any assigned resources in this area.

Based on the current fire behavior, DIVS1 turned around and began to drive out of the area. Approximately 200 yards east of the cabin, along Circle 8 Lane, egress was cut off by fire burning downslope across the road. As DIVS1 began to back up, fire crossed the road behind DIVS1's vehicle.

Photo 1- Fire behavior as viewed looking south toward the drainage of the shelter deployment (4:06 PM, 10/25/19)

At approximately 3:56 PM, DIVS1 radioed the Helicopter Coordinator (HLCO) and declared an immediate life-threat and requested bucket support. HLCO immediately declared an Incident Within an Incident and provided additional air support and requested the rescue helicopter from the helibase. HLCO also began the process of determining the location of DIVS1.

DIVS1 prepared for a potential burnover by removing the fire shelter from the hard plastic liner in the webgear and placed the fire shelter on the center console of the DIVS1 vehicle. As fire intensity decreased the vehicle was backed westward and parked next to the cabin. Due to the smoky conditions, DIVS1 provided GPS coordinates to HLCO and guided them to the location. At approximately 4:04 PM, HLCO located DIVS1. HLCO advised DIVS1 this was a good location and said to remain there as the road was impassable. After placing the fire shelter back in the hard plastic liner within the webgear, DIVS1 exited the vehicle. DIVS1 then prepared for a defensive firing operation out of concern for the spot fire burning above, dense unburned fuels, and the increasing fire activity in the drainage below the location.

Utilizing a fusee, DIVS1 conducted a defensive firing operation to create a larger area of refuge. The firing operation was initiated southeast along the downhill side of Circle 8 Lane, returning on the opposite side of the road. Firing continued around the cabin on the outside edge of the dozer line (Photo 2). At approximately 4:14 PM, as DIVS1 completed the firing operation, a pick-up truck with two civilians arrived at DIVS1's location on the road and stopped behind DIVS1's vehicle. These two civilians were travelling east toward the cabin site from another residence located at the end of Circle 8 Lane.

DIVS1 informed the civilians that their way out was cut off and told them they shouldn't turn around due to increased fire activity behind them. The civilians were wearing t-shirts and pants. DIVS1 asked if they had any other clothing to put on in order to shield their skin from radiant heat. Civilian 1 grabbed a long-sleeve flannel shirt, but Civilian 2 did not have any other clothing. At first, DIVS1 considered using the cabin to shelter the civilians from the heat, but as the radiant heat from the fire increased, DIVS1 decided to use the fire shelter for protection. At approximately 4:16 PM, DIVS1 deployed the fire shelter on the road in front of the two vehicles and directed the civilians into the shelter. DIVS1 contacted HLCO and advised of the fire shelter deployment.

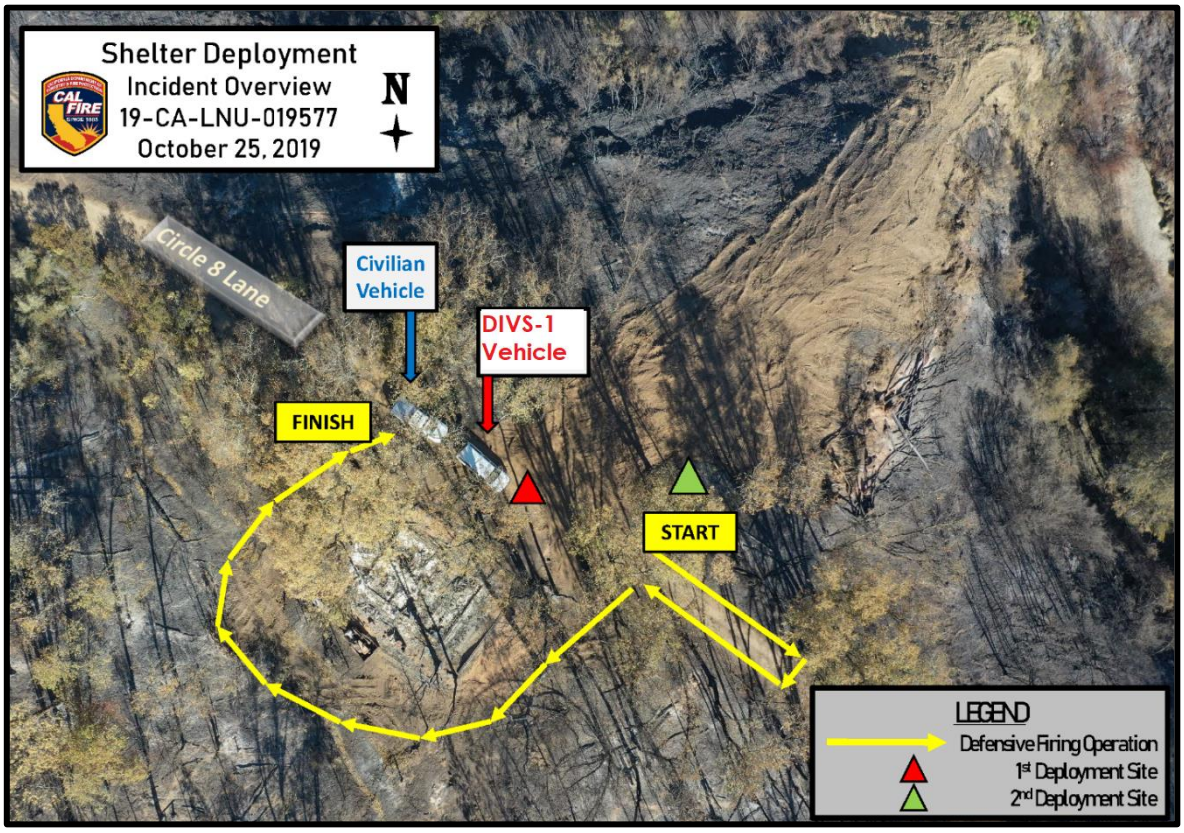


Photo 2 - Aerial overview of deployment location showing approximate location of vehicles, firing pattern along road and around cabin (destroyed), and dozer line coming up from drainage to the northeast.

For approximately ten minutes, all three of them remained covered by the fire shelter. While under the fire shelter, they faced each other in a tripod-shaped arrangement in crouched positions, leaning forward, with heads tucked down. DIVS1 and the civilians noticed ember cast coming in under the shelter in areas where it was difficult to maintain a seal against the ground. DIVS1 periodically peeked outside the shelter as the fire burned around their location to assess conditions. Once the ember cast died down, DIVS1 exited the shelter and noticed the cabin was starting to ignite. DIVS1 relocated to a site

further away from the cabin on the dozer line. When conditions were favorable, DIVS1 and Civilian 2 moved the vehicles away from the burning cabin to prevent them from igniting. HLCO supported their deployment location with 4 helicopters applying approximately sixteen water drops during the entrapment.

At approximately 4:42 PM, a CAL FIRE Prevention Officer, the Operations Section Chief, and two Fire Line Medics arrived at DIVS1's location. DIVS1 and the two civilians were quickly evaluated for injuries and driven by the Fire Line Medics to three ambulances staged on Pine Flat Road. HLCO continued to support the evacuation from the air with helicopters to assist with any potential egress issues.

Video 1- Aerial overview of deployment location showing decreased fire intensity due to firing operation around cabin.
(Click here for Video)

DIVS1 and the civilians were evaluated by the awaiting medics. DIVS1 and the two civilians were transported to local hospitals where they were further assessed and released later in the evening.

INJURIES/DAMAGES

- There were no injuries resulting from this event.
- One utility vehicle sustained minor heat-related damage.

SAFETY ISSUES FOR REVIEW

Although not necessarily contributing factors, the following safety items should be reviewed in relation to this incident:

- Review of PPE policies
  - CAL FIRE Personal Protective Equipment Plan (inspection, use, care)
  - CAL FIRE 1700 Handbook
    - 1721 Personal Protective Equipment, General Information
    - 1722 Head, Neck, and Ear Protection
    - 1725 Body Protection
    - 1726 Hand Protection

- The links below provide useful information including training and inspection of fire shelters.
  - CAL FIRE Safety – Fire Shelter Toolbox (at the bottom of the page): http://calfireweb/organization/fireprotection/safety/
  - US Forest Service Technology and Development Fire Shelter Information: https://www.fs.fed.us/t-d/php/library_card.php?p_num=0651%202322P
  - NWCG Fire Shelter training reminders: https://www.nwcg.gov/sites/default/files/committee/docs/fssc-2019-fire-shelter-training-reminders.pdf
- Review of Common Denominators of Wildland Fire Tragedies is essential to minimize personnel exposure to hazardous conditions. (Incident Response Pocket Guide page 5)
  - (#5 Critical Burn Period between 2:00 PM – 5:00 PM)
  - “A tactical pause may be prudent around 2:00 PM for reevaluating your situational awareness of topography, weather, and fuel.”
- Review of safe and effective radio communications, including knowledge of radio equipment, frequencies, and clear text is essential for prompt, appropriate, and precise responses to changing fire-ground conditions.

INCIDENTAL ISSUES/LESSONS LEARNED

Incidental Issues

- The report of some personnel assigned to the Division not properly or completely wearing PPE led to DIVS1 searching Circle 8 Lane where the entrapment and fire shelter deployment occurred.
- The rapidly changing fire conditions and lack of familiarity of the access/egress limitations of Circle 8 Lane contributed to the entrapment and fire shelter deployment.
- All shelter PVC bags manufactured since June 2005 are made with a reinforced design. PVC shelter bags made before this change should be retrofitted.

Lesson Learned

- Continuous engagement of effective Situational Awareness is essential to having the most current information for safe as well as successful strategic and tactical decisions. DIVS1's clear and concise communication contributed to a quick response of the assisting resources.
- The practice of appropriate and timely actions (recognize, validate, and act promptly) can lead to successful outcomes in life-threatening situations. The ability of DIVS1 to assess, plan, and adjust tactics allowed adaptability for survival.
- Shelter Deployment Site – The two-track road and dozer line was an area cleared of surface fuels. It appears that the small burnout done by DIVS1 provided a shelter deployment site that did not receive direct flame contact – important for a successful shelter deployment. The site was mainly exposed to radiant heat energy.
- Having three people, DIVS1 and two civilians, inside the shelter coupled with moving locations and DIVS1 leaving and reentering the shelter, likely increased the amount of structural damage to the shelter – although a successful deployment.

PHOTOS/SITE DIAGRAMS/MAPS