

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



# GREEN SHEET

## Firefighter Injuries and Fatality

August 13, 2018

Mendocino Complex (Ranch Fire)

18-CA-MEU-008674

18-CA-MEU-009504

California Northern Region

### SUMMARY

On Monday, August 13, 2018, a Utah Multi-Agency Taskforce (TF2), with leader (TFL2), and a Kings County Strike Team of Type VI Engines (STF1) were assigned to Branch I, Division C of the Ranch Fire located above the community of Ukiah in Mendocino County, California.

On the northwestern flank of the fire, aerial retardant drops were used to reinforce the dozer line. TFL2, two Fire Captains (FC1 and FC2) and a Fire Apparatus Engineer (FAE1) from STF1 were struck by falling tree debris resulting from a retardant drop. TFL2 was struck by an uprooted tree and suffered fatal injuries. FC2 was struck by a broken tree top and suffered major injuries. FC1 and FAE1 were struck by falling tree debris that caused moderate injuries.

## CONDITIONS

### **Location:**

The accident site is in the eastern portion of Mendocino County, northeast of the town of Ukiah, along the northern most section of the Middle Mountain Range, approximately 500 yards north of Irishman's Flat. The Middle Mountain Range separates the Eel River watershed to the north and east and the Russian River watershed to the south and west. The accident site is located at 39° 21.4579' latitude and -123° 3.4410' longitude.

### **Weather:**

Elevation:	3,000 feet
Temperature:	82° Fahrenheit
Relative Humidity:	21%
Winds:	Northwest at approximately 3 to 5 miles per hour

### **Fuel Type:**

The fuels consist predominantly of Douglas Fir with a small hardwood understory mixed with patches of manzanita and other brush. The site is described as a Northern Forest Fire Laboratory Fuel Model 10<sup>1</sup>. The primary carrier of fire is surface and ground fuels comprised of dead and down fuels greater than three inches in diameter or larger limb wood resulting from over-maturity or other natural events.

### **Topography:**

There are multiple intersecting drainages with short, moderate to steep slopes. The accident site was on a flat bench.

### **Fire Behavior:**

The fire experienced extreme fire behavior exhibiting long-rang spotting with fuel and wind driven runs. At the time and location of the accident, the fire showed moderate fire behavior with slope as the dominant fire behavior component.

### **Aircraft Information**

The airtanker was a Boeing 747-400 configured as a Very Large Air Tanker (VLAT). The retardant capacity of the plane is 19,200 gallons. The retardant system consists

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<sup>1</sup> United States Forest Service General Technical Report INT-122; Aids to Determining Fuel Models For Estimating Fire Behavior, Hal E. Anderson, April 1982.

of two separate, but identical, pressurized constant flow systems capable of continuous discharge or up to 8 segmented drops. The retardant system can produce coverage levels ranging from 2 to 8 depending upon the tactical objectives specified by the aerial supervisor.

Coverage level refers to the number of gallons of retardant applied on fuels per 100 square feet. Coverage levels vary from 0.5 to greater than 8 and are selected by the aerial supervisor, based in part, upon nationally recognized fuel models. The coverage level may need to be increased under more adverse burning conditions or when retardant does not effectively penetrate a heavy tree canopy.

## **SEQUENCE OF EVENTS**

On July 29, 2018, due to unprecedented fire activity throughout the state, large resource orders were placed including resources from out of state. STF1 and TF2 responded from Utah to assist. STF1 arrived on July 30, 2018 and TF2 arrived on August 2, 2018. Both resources were assigned to the Ranch Fire.

On August 13, 2018, at approximately 7:00 AM, TFL2 attended the operational briefing at the Mendocino Incident Base for the Ranch Fire. TFL2 and FC1 participated in the division break out with the Division Supervisor and trainee at the Ranch Fire Incident Base. During the breakout, the Division C Line Safety Officer shared with all breakout attendees the hazards associated with airtanker retardant drops while working on the line.

At approximately 9:00 AM, TF2 staged at DP19. While staged, TFL2 conducted a tailgate safety briefing and discussed the TF2 line assignment. TF2 then moved to their work location along Division C. Their assignment was to reinforce dozer line and place a hose lay to hold a firing operation. Aircraft firefighting operations commenced on Division C at approximately 1:00 PM when the inversion layer lifted. Aircraft were requested to drop retardant adjacent to the dozer line as a reinforcement to hold the line. Coordination efforts were in place between DIVS C, Air Attack, and the Aerial Supervision Module (ASM).

At approximately 3:40 PM, DIVS C announced to DIVS C (T), "Airtankers will be working in the area" on the division tactical frequency. Acknowledging receipt of the message, DIVS C (T) subsequently broadcast a message to "Clear the area out" on the assigned tactical frequency. Only one strike team leader acknowledged hearing the broadcast. At 4:02 PM, a large airtanker (LAT) made its first drop on Division C followed by a second drop at 4:23 PM from another LAT. At 4:44 PM, a third LAT dropped on Division C approximately 300 feet to the west of the accident site. The drop landed further outside the dozer line than desired.

DIVS C requested the next drop be “snugged up” closer to the dozer line. The ASM acknowledged the request and advised a closer drop would cause retardant to land on the dozer line. DIVS C acknowledged this information. The ASM made a “show me” run for the VLAT over the intended path for the retardant drop with the VLAT observing. The ASM requested a coverage level six retardant drop and a minimum drop altitude at 3,200 feet mean sea level (MSL).

At approximately 5:25 PM, the ASM proceeded on a final approach over the drop path. The ASM identified the drop path to the VLAT by use of a smoke trail. The VLAT initiated the retardant drop as identified by the smoke trail. Obscured by heavy vegetation and unknown to the VLAT pilot, a rise in elevation occurred along the flight path. This rise in elevation resulted in the retardant drop only being approximately 100 feet above the treetops at the accident site.

The force of the retardant drop uprooted an 87-foot tall Douglas Fir with a 15-inch diameter at breast height (DBH). It fell on TFL2 and caused fatal injuries. The drop also sheared an 89-foot tall, 18-inch DBH Douglas Fir 29 feet above the base. The debris hit FC2 and caused extremity injuries and broken ribs. FC1 and FAE1 were struck by falling branches of the trees causing moderate injuries to FC1 and FAE1.

Within seconds after the accident, an Incident Within an Incident (IWI) was declared. Injured personnel were treated by Advanced Life Support (ALS) providers assigned to resources on the division and then transported to the hospital for further treatment.

## **INJURIES/DAMAGES**

1. TFL2 suffered fatal crushing injuries.
2. FC2 suffered broken ribs, deep muscle contusions and ligament damage to extremities.
3. FAE1 suffered deep muscle contusions and ligament damage.
4. FC1 suffered scratches and abrasions.

## **SAFETY ISSUES FOR REVIEW**

- Aerial drops are inherently hazardous and caution should be used when working in areas with aircraft operations.
- Supervisors must ensure all fire line personnel are notified and acknowledge impending aerial drops (fixed wing and rotary wing). When personnel are working under a tree canopy, supervisors must ensure the drop path is cleared.
- Fire personnel need to always maintain situational awareness.

### **Publication References:**

- Incident Response Pocket Guide Guidelines Page 57, [Aerial Retardant Safety](#).
- National Interagency Fire Center (NIFC) 2004 Redbook, [Chapter 12- Suppression Chemicals and Delivery Systems](#).
- CAL FIRE Policy 4306.17-[Airtanker Retardant Drop Safety Precautions](#).
- CAL FIRE Policy 4306.18-[Assuming the Safety Position for an Airtanker Retardant Drop](#).
- 2016 CAL FIRE Safety Communication- [Air Drop Precautions](#).

## **INCIDENTAL ISSUES/LESSONS LEARNED**

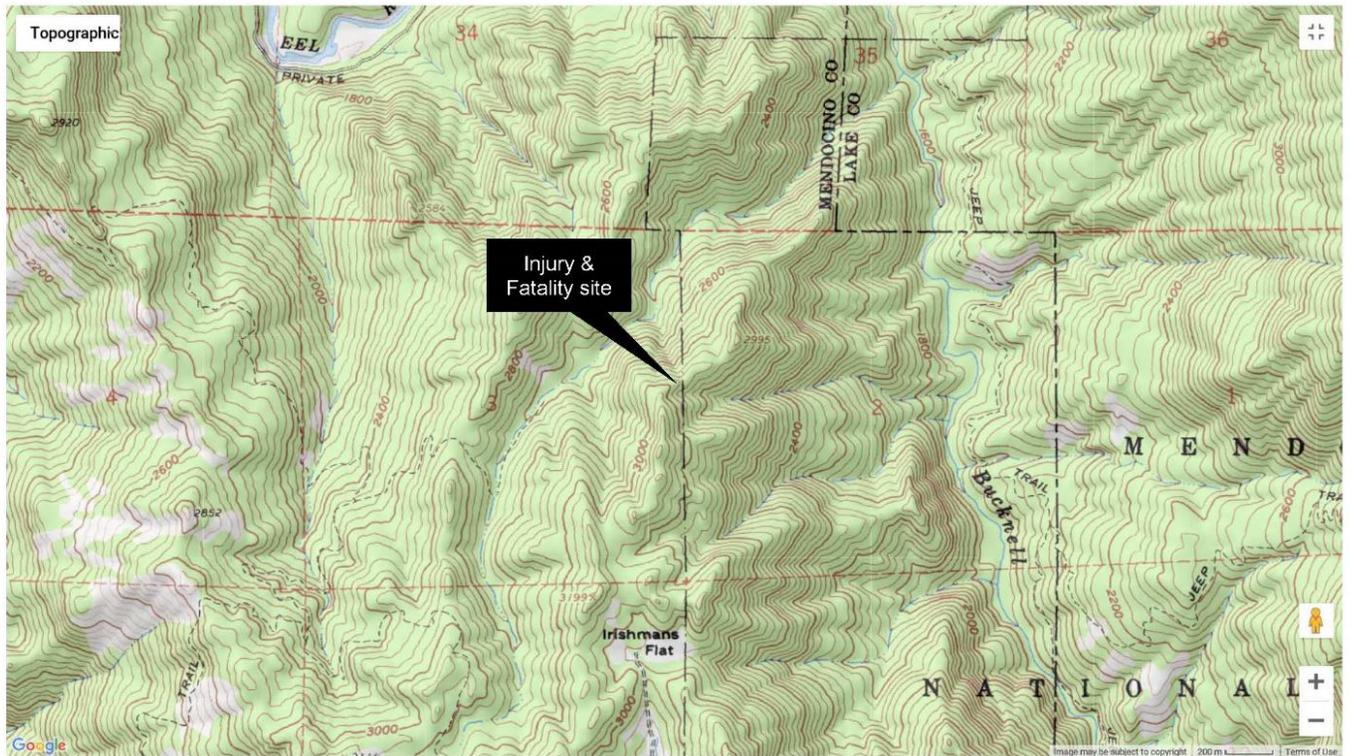
Fireline personnel have used their cell phones to video the aerial retardant drops. The focus on recording the retardant drops on video may distract firefighters. This activity may impair their ability to recognize the hazards and take appropriate evasive action possibly reducing or eliminating injuries.

Aerial drops are inherently hazardous. Caution and situational awareness should be used when working in areas with aircraft operations.

## PHOTOS/SITE DIAGRAMS/MAPS

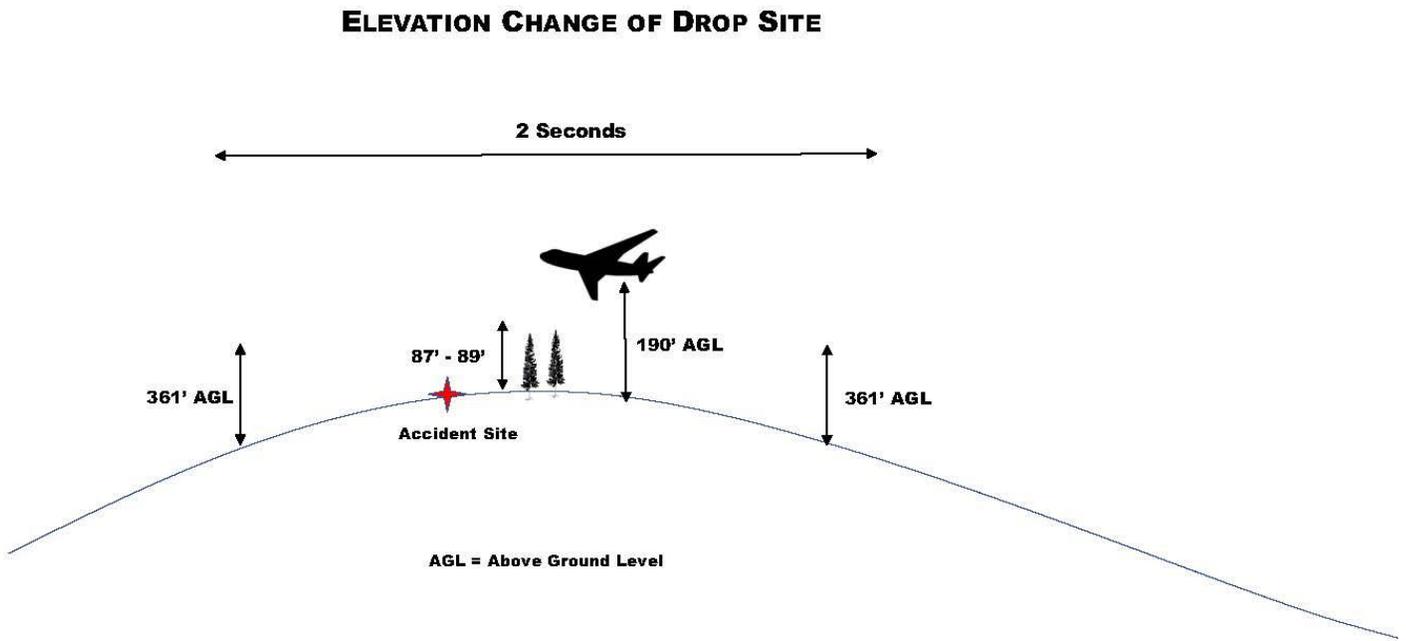
### TOPOGRAPHIC MAP OF ACCIDENT SITE

Mendocino Complex SART  
18CAMEU009504



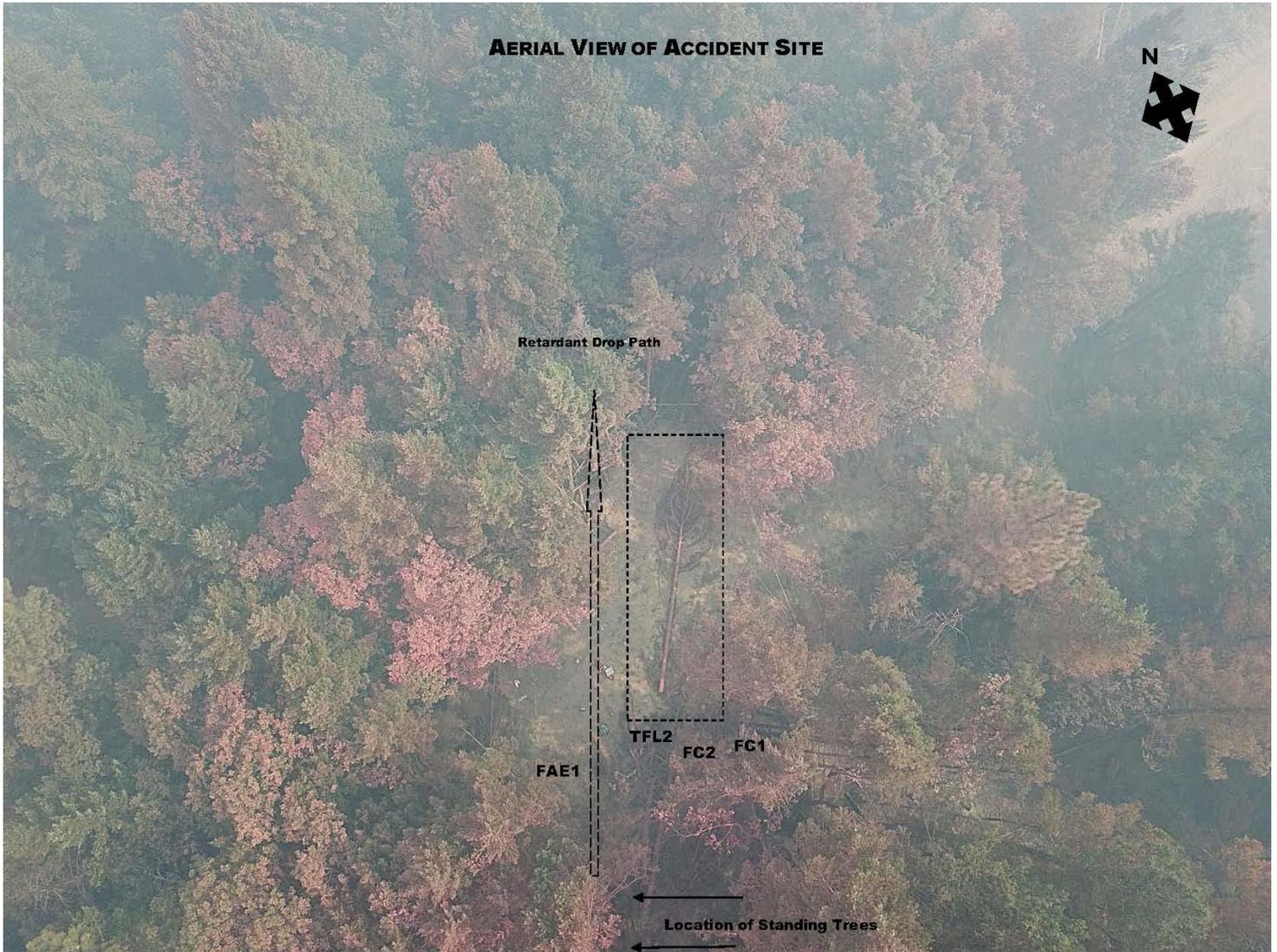
Approx. Maximum Elevation: 3,363 feet (1,025 meters)  
USGS Topo Map Quad: Potter Valley  
Feature Type: Ridge

## PHOTOS/SITE DIAGRAMS/MAPS



Elevation change during retardant drop

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Aerial view of accident site