

UNITED STATES  
DEPARTMENT OF  
AGRICULTURE

FOREST  
SERVICE

Placeville Ranger District  
Eldorado National Forest  
4260 8 Mile Road  
Camino, CA. 95709

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File Code:5100  
Route To:

Date: June 28, 1996

Subject: Sierra Fire Accident, Sequoia N.F., (6/24/96)

To: Regional Forester

Enclosed is the investigation report for flare up accident on the Sierra Fire, Sequoia National Forest, 6/24/96.

The flare up resulted in 1st and 2nd degree burn injuries to firefighters Neil Gamboa and Kevin Poyner. Both firefighters were temporary employees and members of the fire Crew 4, Hots Springs RD, Sequoia NF.

The accident occurred at 1635 on June 24, 1996 on Division X while Crew 4 was constructing direct handline. The crew was being supported by water bucket drops from Helicopter 523. During one of the bucket trail drops, local winds, terrain winds and rotorwash combined to briefly flare up the light, flashy grass fuels and push the fire downhill onto and around 8 members of Crew 4. The 8 crew members escaped downhill, but only Gamboa and Poyner sustained burns.

All members of the crew had proper Personal Protective Equipment. The sequence of events did not allow for deployment of fire shelters, but both Gamboa and Poyner had currently approved and inspected shelters. All crew members were qualified for their fire assignments and were properly trained to current standards.

The Forest Service convened an investigation team to review policy, procedures and attempt to determine cause or causes of the accident. Kern County Fire Department and Forest service officials made up the team.

Based on the team findings, the most probable cause of the accident was a blast of air associated with the helicopter and accelerated by the eddying effects of local and terrain winds. This wind triggered a wave of flame onto and around eight members of the crew. Helicopter, handcrew and overhead personnel were following safety policies and procedures and were utilizing current, sound strategical and tactical fire suppression procedures.

The following are a list of Recommendations, Concerns, Commendations and Actions compiled by the team:

A. COMMENDATION: The excellent interagency relationship between the Sequoia National Forest and Kern County Fire Department was obvious and important in the handling of the incident. The incident was a "routine" unified command. At the time of the accident, Kern County took the lead in medical aid and transportation. The county also provided personnel to do critical Incident Stress De-briefing and video taping expertise. Kern County was an active and important part of the investigation team.

B. CONCERN: There is a concern from the team that no more rules, orders, pins, stickers, cards or decals result from this incident. The 50 existing 10's and 18's, etc, etc, are already more than enough.

RECOMMENDATION: Adopt something similar to the "Fire Environment Size-Up" suggested by Jim Cook, National Park Service Hotshot Superintendent, (Wildfire magazine, Dec. 1995).

C. CONCERN: The standard issue leather glove in combination with the fireshirt needs to be reviewed. There can be an unprotected portion between the glove and the sleeve. The size of the burn injuries is determined by the gap between the glove and the shirt.

RECOMMENDATION: Ensure protection for this area of the body by (1) having the sleeves long enough so that gaps are not produced when arms are extended or bent; (2) or velcro wrists tightly; (3) or re-evaluate the length of gloves.

D. CONCERN: The "Oakley" sunglasses worn by Neil Gamboa provided facial protection against radiant heat. The facial area protected by the sunglasses is clearly outlined. The sunglasses also provide ultra-violet protection and some protection from debris.

RECOMMENDATION: Evaluate these type of glasses as an optional piece of protective gear.

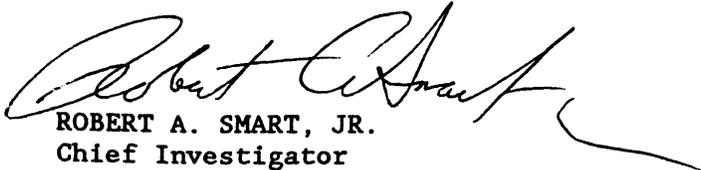
E. CONCERN: Subtle changes instantaneously changed the fire behavior in the fine fuels. The subtle changes in the converging winds and topography combined with the effects of the helicopter water drop to cause the flareup instantaneously. These subtle changes were not obvious to the firefighters. This is a COMMON DENOMINATOR OF FIRE BEHAVIOR ON TRAGEDY FIRES: FLARE-UPS GENERALLY OCCUR IN DECEPTIVELY LIGHT FUELS.

RECOMMENDATION: Create a professional workforce of Wildland Firefighters, highly trained in Wildland Fire Behavior taught from the fireline perspective of the "Look Up, Look Down, Look Around" training course.

F. COMMENDATION: "All the bases were covered" by Sequoia Crew 4 and Division Supervisor Dan Kleinman and IC Dale Dague. LCES, PPE, and the other safety measures taken were textbook along with suppression strategies and tactics..

G. COMMENDATION: Morgan Mills, Region 5 Aviation Officer, responded immediately, upon request, to the site of the injuries. His technical expertise was critical to confirming that there were additional aerial dynamics involved. The easy answer was to blame the helicopter. Morgan explained that the blast was caused by more than the rotor wash, and why this drop had a different effect than the previous 20.

H. ACTION: The Personal Protective Equipment for the 2 injured were mailed to Ted Putman, Missoula Equipment Development Center, for evaluation and data input. There is a need to send a copy of this report to Ted Putnam for his equipment evaluation.

  
ROBERT A. SMART, JR.  
Chief Investigator

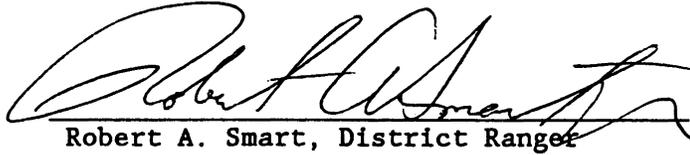
ACCIDENT INVESTIGATION REPORT  
SIERRA FIRE

Accident: Employee Burns on June 24, 1996

Location: Pacific Southwest Region 5  
Sequoia National Forest  
Cannell Meadows Ranger District

Report Date: June 28, 1996

CHIEF INVESTIGATOR

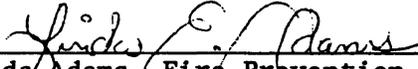


Robert A. Smart, District Ranger  
Placerville Ranger District, Eldorado National Forest

TEAM MEMBERS:



David J. Kohut, Fire Management Officer  
Sierra National Forest



Linda Adams, Fire Prevention Officer  
Greenhorn Ranger District, Sequoia National Forest



Darrell Tiede, Chief Fire Investigator  
Kern County Fire Department

INVESTIGATION REPORT  
Burn Incident on the Sierra Fire  
Cannell Meadow Ranger District  
Sequoia National Forest  
June 24, 1996

I. NARRATIVE

On June 24, 1996, the Regional Forester of the Pacific Southwest Region designated a team to investigate the burn incident that had occurred that day on the Sierra Fire, Cannell Meadow Ranger District of the Sequoia National Forest. In the incident two fire fighters received first and second degree burns as they worked to construct direct line on the fire. The need for an investigation team was determined during a conversation between Lee Belau, Acting Forest Supervisor of the Sequoia and Lyle Shook, Regional Safety Officer. The team assembled at the Cannell Meadow Ranger Station at 1330 on June 25, 1996 and received a briefing from Lee Belau. The designated line officer for this team is Joe Cruz, Assistant Regional Forester for Fire and Aviation Management.

A. Team Members

Bob Smart is a District Ranger and a former National Incident Commander and is designated as Chief Investigator.

Dave Kohut is the Fire Staff Officer of the Sierra National Forest and currently a National Incident Commander.

Darrell Tiede is the Chief Fire Investigator for Kern County Fire Department.

Linda Adams is a trained Fire Behavior Analyst with local fire behavior knowledge and currently is working as a Fire Prevention Officer, Greenhorn Ranger District SQF.

B. Team Coordination

The Team worked out of the Cannell Meadow Ranger Station in Kernville, CA.

C. Information Coordination and Data Collection

Information was gathered by conducting interviews, visiting the accident scene, and gathering records.

1. The following individuals were consulted/interviewed:

- Dan Kleinman, Greenhorn Ranger District, Sequoia National Forest
- Neil Gamboa, Fire fighter, Crew 4, Hot Springs RD, SQF
- Kevin Poyner, Fire fighter, Crew 4, Hot Springs RD, SQF
- Brent Skaggs, Crew Supervisor, Crew 4, Hot Springs RD, SQF
- Mike Carlton, Pilot of Helicopter 523
- Dale Dague, Incident Commander of the Sierra Fire and District Fire Management Officer, Cannell Meadow RD, SQF.
- Morgan Mills, Regional Aviation Officer for R-5

2. The following records were consulted:

Training records for Crew 4  
Red Card ratings for Kleinman, Gamboa, Poyner, and Skaggs  
The Pilot and Aircraft Cards for Helicopter 523  
The Medical Records for Gamboa and Poyner

II. FINDINGS

A. Relevant Findings

1. The Red Cards and Training of all the fire fighters met current standards for the positions they occupied. The crew was properly equipped with Personal Protective Equipment for their line assignment.

2. The strategy and tactics had been discussed with the appropriate personnel and were being implemented.

3. Helicopter 523 was following instructions and operating according to standards.

4. The fire was being fought in rough broken terrain where the grass averaged two feet high. There were light local northwest winds blowing across the ridge and terrain winds were light from the west south west and were blowing up the deep gully.

5. The blast of air that hit the crew was associated with the helicopter, accelerated by the eddy effect of the local and terrain winds.

6. The elapsed time from the beginning of the wind event until the crew members were burned is only seconds.

B. Causal Factors

1. The incident was caused by a blast of air that triggered a wave of flame. The flame rolled down the slope and onto and around eight members of the crew.

2. The hand crew persons had lost situational awareness of the helicopter. One of the COMMON DENOMINATORS OF FIRE BEHAVIOR ON TRAGEDY FIRES describes this situation-"Some suppression tools, such as helicopters or air tankers, can adversely affect fire behavior. The blasts of air from low flying helicopters and air tankers have been known to cause flare-ups."

3. The hand crew had unburned fuel between them and the fire, which is a WATCHOUT SITUATION. This unburned fuel did contribute to the burns on the firefighters, but it is obvious they were aware of the hazard and were trying to stay direct.

C. Supporting Data

Sequence of Events

The 16 persons on Crew 4 from the Hot Springs District were dispatched to the Sierra Fire as part of the initial attack. The crew was joined by the six person KV/TSI crew, that is also based and trained at Hot Springs. They proceeded up the hill to the fire line. Helicopters 522 and 523 had established a "race track" pattern of dipping from the Kern River and returning to the flank of the fire. The tactics were to make water drops in front of the crews so that hand line could be constructed. The crewboss, Brent Skaggs,

### Sequence of events continued

received a briefing from Division Supervisor Dan Kleinman and began working his crew easterly along the line. Approximately 10 minutes after they began work, a Gray Pine tree, killed by a fire 2 years before, flared up. It appears the heat from this rapidly burning tree pushed some of the crew 4 to 10 feet down the hill, away from the fire line. Almost simultaneously H-523 flew over the crew and made a water drop ahead of the crew. The two crew members that were burned did not see the helicopter. A blast of air and flame hit the front of the crew. Eight crew members, including Gamboa and Poyner, were briefly surrounded by flames but ran down and out of the fire finger. Gamboa and Poyner were the only crew persons burned. The incident occurred at 1635, June 24, 1996.

### III. Commendations to the Sequoia National Forest and Kern County Fire Department.

- A. The unified fire team on the fire responded very well to the burned individuals. Medical treatment was rapidly obtained.
- B. The Forest and County did an excellent job of video taping the interview with Dan Kleinman and identifying the victims clothing. The video does not accurately show the accident scene.
- C. The Forest and Kern County have provided excellent support to the investigation team in making personnel available to work on and with the team.

Wind NW 3-8 mph, gusts 15 across ridge

North

Helicopter

Flight Deck

X Div Sup  
Kleinman

fireline

boulders

teaching tree

100 feet vertical elevation  
change from  
gully to ridge

water drop

crushed wood

Area hit by  
wave of flame

Sierra Fire  
6-24-92 1635

Wind

W-500 light upslope

