BURN INJURIES INVESTIGATION ON HAMLIN CMP ESCAPE

BUTTE RANGER UNIT

SEPTEMBER 3, 1983

K-II
Homelands CMP Escape

State of California — The Resources Agency

Memorandum

To : Administrative Services Officer (Acting)
Chiefs
Department of Forestry

Date : November 10, 1983

S30

Telephone: ATSS (8) 492-1969
(916) 322-1969

From : Department of Forestry

Subject: 2300 SAFETY
2360 Accident-Injury Prevention
1983 Escape Control Burn Injuries

Three U.S. Forest Service fire fighters received minor burns during an escaped CDF control burn located at a canyon. Had they not deployed their fire shelters, they would have been seriously burned or worse.

The crewman suffering the worst injuries was forced from his shelter because his boots and pants caught fire when vegetation burned within his shelter. He received burns to his knees and legs from ground fire and facial burns from radiant heat after leaving his tent. Goggles saved his eyes from injury.

Another fire fighter had minor face burns from vegetation burning in his tent. He had eye irritation from cinders and ashes because his goggles were not used.

The third fire fighter had initially decided not to use his tent because it had two inch slits and pinholes along creases. However, another fire fighter convinced him that it was better than no protection. As it turned out, he suffered least of all, as his deployment area was relatively clear of vegetation and therefore did not burn as hot.

The burn got out of control as it started burning down the east canyon wall. It gained considerable momentum in crossing the canyon floor and started up the west wall, about 300-400 yards south of the east fireline.

The incident commander ordered the burn boss to backfire down the west canyon rim to prevent the fire from "bumping" the west fire control line too hard. The firing boss proceeded to the west rim, taking a fire crew with him to control spot fires.

As the fire intensified, three crew members found themselves isolated and trapped on a bluff with a 60-foot wall above them, a 15-foot cliff below them, and without water protection (their fire hose had burned through). They deployed their shelters, having no time for vegetation clearance, and the fire blew over them.

Please discuss this incident with fire managers and fire fighters. Also, include this information in the seasonal fire fighter training program. Emphasize the following:

1. Control burns can be just as hazardous as wildland fires under certain fire behavioral conditions. Managers must not be lulled into thinking that control burns present no fire management problems.

2. Fire managers must feel free to cancel burns when weather or control line sites are not right for burning.

3. Supervisors of crews must plan control activities as if the burn is a wildland fire engagement.

4. Fire shelter deployment training should include actual vegetation clearance in areas similar to wildlands.

5. Inspect fire shelters frequently during fire season to make sure they are always in good condition. If there is any doubt about a shelter's condition, replace it.

6. Instruct fire fighters not to sit, lie on or otherwise mishandle fire shelters, thereby causing them to deteriorate.

7. Advise fire fighters that small pinholes along crease lines do not make the shelter ineffective. (All the shelters on this fire had small pinholes along crease lines.)

8. Tell fire fighters that a shelter can accommodate two people if someone does not have one. Also inform them that a person without a shelter can at least breathe cooler and cleaner air by sticking his/her head into another person's shelter.

9. Instruct fire fighters to talk to one another while in shelters to help alleviate stress or panic.

10. Again review the "10 Standard Fire Fighting Orders" and "Thirteen Situations That Cry Watch Out!" (There were a number of violations of both the "10 Standard Fire Fighting Orders" and "13 Situations That Cry Watch Out!")

MARK TIMMERMAN
Assistant to the Director

gd

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TITLE: BURN INJURIES INVESTIGATION ON HAMLIN CMP ESCAPE, BUTTE RANGER UNIT

ACCIDENT DATE: SEPTEMBER 3, 1983

ACCIDENT INVESTIGATION TEAM:

CHAIRMAN
Don Paulsen, SFR III
CDF Region II Headquarters

TEAM MEMBER
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CDFEA REPRESENTATIVE
Bill Hodson, FCS
Crystal Creek Conservation Camp

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The objective of this investigation team is to gather the facts concerning the circumstances leading to the accident resulting in injuries to three Davis Organized Fire Crew members. The team will investigate the firing techniques and the decision to continue with the project only as it relates to the accident.

The team will gather the facts by visiting the site of the accident, interviewing the victims, and interviewing persons that have knowledge of the accident.

Problem statements with explanations will summarize the factors observed by the investigation team in this accident. The ten standard firefighting orders and thirteen situations that shout "Watch Out" will be reviewed as they pertain to this accident.

PEOPLE INTERVIEWED

NAME	TITLE	POSITION ON FIRE
Bill Teie	Ranger in Charge	--
Arlen Cartwright	Operations Officer	Incident Commander
Roy Sprague	Fire Captain	Safety Officer
Craig Carter	Forester II	Liaison Officer
Candace Gregory	Jr. Forester	Recorder
Dale Waugh	Battalion Chief	Div. Supervisor
Vic Weaver	Fire Captain	Div. Supervisor
John Hawkins	Admin. Officer	Ops. Section Chief
Greg Robb	FAE	Engine Operator
Hugh Jarred	Fire Captain	Firing Team Leader
Chuck Sheley	USFS Crew Coordinator	Strike Team Leader-Crew
Jim Ramage	CDF Pilot	Helicopter Pilot
Hector Reed	Battalion Chief	Ops. Section Chief
Tom Woodfill	USFS Davis Crewmember	Firefighter
Gunther Juncker	USFS Davis Crewmember	Firefighter
Richard Delwiche	USFS Davis Crewmember	Firefighter

SUMMARY

On Saturday, September 3, 1983, at about 1300 hours, a Butte County CDF Chaparral Management Burn escaped control burning three members of the Davis Organized Fire Crew from the Mendocino National Forest. The crew members names are: Gunther Juncker, Richard Delwiche and Tom Woodfill.

The Davis Organized Crew, with one Fire Training Coordinator, were assigned to Hamlin Canyon CMP about 1015 hours to remove a Digger pine top and limbs that were near the West rim of the canyon. The tree was on a bluff with a 15 foot cliff below and 60 foot cliff above them. Their assignment was also to remove other fuels along the fire break which was about 3/8 of a mile across canyon. The vertical change in elevation from the canyon rim to the wet creek below was about 400 feet. The fuels in the area were oak-woodland with grass and brush understory.

An engine was on top of the East and West sides of the canyon with a 1½" hose over the cliffs down to the creek. Numerous 1" laterals were on each hose lay. A 4WD fire engine was down in the canyon on the fire break located about two-thirds of the way down the East side. Access was up Hamlin Canyon on a 4WD road. CDF Division Supervisors were on the East and West canyon rim and each could see across the canyon to check for spot fires. The Operations Section Chief was in the helicopter overhead.

A CDF firing team consisting of one Fire Captain and an assistant started firing the East side at about 1200 hours, working from the top down to the road where the 4WD engine was parked. The helitorch was then activated to form a draft and keep spots from crossing the line. Several spots did occur over the line and the Davis Organized Fire Crew, in conjunction with the helicopter and water bucket, controlled the spots.

The fire then crossed the 4WD road near the bottom of the canyon and started burning up slope on the West canyon wall. The firing team then went to the top of the West canyon wall to try and develop a black line so the fire would not hit the fire line as hard. Five or six Davis Organized Crew members went with the firing team to work with the hose lines to control spot fires. The firing team proceeded burning down the West line faster than they wanted to because they knew the spot fires further down canyon were moving fast towards the control line. Two or three members of the Davis Organized Crew were working on spots on the green side of the line and got down the edge of the 15 foot bluff and to safety. The spots on the green side of the line were becoming too numerous and enlarging faster than the crew members could contain. Heat, smoke, wind, noise and ash were now being generated on both sides of the line and Juncker, Delwiche and Woodfill were unable to use their escape route; they were trapped on the bluff.

They reluctantly decided to deploy their fire shelters, scooping away what duff and litter they could before deployment. Juncker and Delwiche deployed close together, and Woodfill about 10-13 yards further south. After about 5 to 7 minutes, Delwiche was driven out of his shelter because fire was burning his pants, boots and the duff he was laying on. The heat was very intense outside his shelter so he ran behind several rocks to escape radiant heat. Delwiche received burns to his lips, face and right leg from the knee to ankle; his lungs also showed signs of breathing hot air and smoke. He wore his goggles and received only minor eye irritation.

Juncker received some burns when fire came under his shelter, and eye irritation from cinders and ash. He was not wearing his goggles, but was breathing through a wet hankerchief.

Woodfill's selection of location to deploy his shelter was probably not quite as hot as the other two crew members and received the least injuries. He said he was trying to brush embers off his sleeve, but in reality they were red spots showing through the pin holes in his shelter causing the illusion of embers on his sleeves. Being that he was further away, he could not hear any sounds from Juncker's tent and he was worried for Juncker's safety. Woodfill stood up numerous times to see how Juncker was doing, but was forced down again mainly because of heavy smoke, and to a lesser extent, heat.

After the main flame and heat passed, they were led from the area, treated by CDF EMT's and medivaced by CDF helicopter to Chico airport and then by ambulance to Chico Community Hospital Burn Center. One firefighter was released from the hospital on Sunday, September 4, 1983, about 1200 hours without any permanent injuries. The other two firefighters were released on Monday, September 5, 1983, one with eye irritation, the other with lung congestion. All three firefighters suffered slight first and second degree burns on a small percentage of the body. Delwiche also received second degree burns to the area around his right knee and calf.

EVENTS THAT LED TO THE DAVIS ORGANIZED CREW BEING ON THE HAMLIN BURN:

The Davis Organized Crew was working on the Hamlin CMP burn as part of a continuing fire training program. The Forest Service allows 40 hours of paid training each fire season per organized crew member. The Mendocino spreads out this 40 hours throughout the fire season to take advantage of work that closely simulates actual fire line work, and to keep up the interest of these crew people. Minimum basic fire training, approximately 32 hours, is taken at the beginning of each fire season. No pay is received for this training.

Mendocino Organized Crew Coordinator Chuck Sheley has been working with the Forest Service and the CDF to provide training assignments that relate to actual fire line work and, if possible, accomplish an agency objective. Sheley has developed training which involves cutting hand fire line around clear cut blocks on National Forest Land that will be burned at a later date.

Sheley contacted Butte Ranger Unit to see if they had any training opportunities. They suggested work on the Hamlin CMP Burn. Obviously, this provided an excellent training ground for this crew. The crew included two Davis Crew Leaders and 32 firefighters led by Chuck Sheley (red carded Strike Team Leader-Crews). The crew worked on the burn on September 2, 1983, and remained overnight

in Chico on the night of September 2. They returned to the burn on the morning of September 3 to support the burning. They were to leave the burn on the afternoon of September 3 and return to Davis.

At the time the burn escaped, approximately 1300 hours, the CDF placed a fire order for the Davis crews, which made them a part of the suppression effort. At approximately 1310 hours, the accident occurred. After the burned crew members were evacuated, the CDF allowed the Davis crews to walk out of the area and back to their bus. After returning to the bus, Crew Coordinator Sheley determined that the crew was in a mental condition that would not allow them to continue on the fire line in a safe manner. The CDF agreed and released the crew.

REVIEW OF THE TEN STANDARD FIREFIGHTING ORDERS

The accident investigation team feels that a review of the Ten Standard Firefighting Orders as they apply to this situation might be a valuable learning tool for readers of this report.

1. Keep informed on fire weather conditions and forecasts.
   The Forest Service Strike Team Leader was involved in the pre-burn briefing where weather conditions were discussed. The crew observed burning on the East side of the canyon previous to burning on the west side where the accident happened.

2. Know what your fire is doing at all times.
   This order was followed by direct observation.

3. Base all actions on the current and expected behavior of fire.
   This order was followed.

4. Plan escape routes for everyone and make them known.
   This order was followed for all of the crew, except the three people involved in the accident. The escape route was to walk to the canyon bottom and stay in the fire line. Only one escape route was known to the three crew members involved in the accident and it meant climbing down a very steep cliff in which the crew had made small steps. During ideal conditions,

this escape route was slow and hazardous. During the erratic fire behavior, this route was unusable due to smoke, flame and heat.

5. Post a lookout where there is possible danger.

This order was followed by having a number of people on the rim above the line. Positive radio communication between these people and the Strike Team Leader was established.

6. Be alert, keep calm, think clearly and act decisively.

This order followed to some degree. The accident victims related how they deployed their shelters and selected spots to lay down. Some evidence of concern is apparent, however, the minimal nature of the injuries indicate that the basics of this order were followed.

7. Maintain prompt communications with your crew, your boss and adjoining forces.

This order was not followed entirely. The Strike Team Leader had been issued one CDF personsl portable radio and maintained communications with the Division Supervisors and firing team, but radio communications were not made available to the crew. Verbal communications were possible due to the length of the line at this location. However, when the erratic fire behavior occurred, verbal communications with the three crewmembers was not possible.

8. Give clear instructions and be sure they are understood.

Indications are that clear instructions were not given to the injured crew members. The firing boss told them to watch for spot fires and deploy the water lines if necessary. When the escape occurred, the engine supplying the hose lay ran out of water when the hose burned. At this point, the firing boss was out of the area and the Strike Team Leader was out of verbal communications range.

9. Maintain control of crewmembers at all times.

Actual control was not possible due to smoke and fire. However, the crew training program showed its effectiveness when the relatively inexperienced crew members acted in a way that resulted in only minor injury. It is this team's opinion that more experienced overhead should have been assigned to this Strike Team. This is addressed in another section of this report.

10. Fight fire agressively, but provide for safety first.

Fighting fire agressively probably caused the three firefighters to stay in this area too long. They were attempting to extinguish the spot fires and by the time they realized that they were not going to be able to complete their task, their escape route was over-run with flame, heat and smoke.

REVIEW OF THE THIRTEEN SITUATIONS THAT SHOUT "WATCH OUT"

The accident investigation team feels that a review of the thirteen situations would be a valuable learning tool.

1. You are building a line down hill toward a fire.

   This situation is not a factor in this accident.

2. You are fighting a fire on a hillside where rolling material can ignite a fire below you.

   Not a factor in this accident.

3. The wind begins to blow, increase or change direction.

   Definitely a factor in this accident. Witnesses related to the heavy gust of up canyon wind that blew a number of spots across the fire line.

4. The weather turns hotter and dryer.

   Not a factor in this accident.

5. You are on a line in heavy fuel with unburned fuel between the firefighter and the fire.

   This situation is what caused the fire overhead to hurry the backfiring of the West side of the canyon. They were concerned that a spot fire on the West side of the canyon would bump the fireline, if the backfire was not complete.

6. You are in an area where the topography and/or cover makes travel difficult and slow.

This situation was definitely a factor in this accident. At best, travel on this section of line was difficult and slow.

7. You are in unfamiliar country.

Not a factor in this accident.

8. You are in an area where firefighters are not familiar with local factors influencing fire behavior.

Not a factor. The crew was not familiar with local conditions, but all the other firefighters on the line and the overhead were local.

9. You are attempting a frontal assualt on a fire with pumpers.

Not a factor on this accident.

10. Frequent spot fires are crossing the line.

This occurred on this incident and was a definite factor in the accident.

11. You cannot see the main fire and you are out of communication with anyone who can see it.

Not a factor.

12. You do not clearly understand your assignment or instructions.

This was a factor in this accident. The three injured firefighters took some instructions from the firing boss, but were

not in communication with any other overhead and were not clear as to their assignment when the firing boss worked his way down the fire line.

13. You are drowsy and feel like taking a nap near the fire line. Not a factor in this accident.

PROBLEM STATEMENT #1

SUBJECT: Fire Shelters

STATEMENT OF FACT:

Fire shelters deployed by the three USFS Organized Crew members helped reduce the amount and severity of injuries received.

SUPPORTING DATA:

1. The injuries were of first and second degree burns received from the ground litter where the crew members laid down to cover themselves with their shelters. One crew member also received first degree burns about his face when he stood up out of his shelter to escape the excessive heat build-up inside his shelter, caused by burning around litter. His shelter also showed signs of high heat in the area of his right knee, which correlates to the injuries he received.

2. A statement from Organized Crew member Tom Woodfill emphasized that the condition of his fire shelter was such (holes and tears) that he was not going to use it after he deployed it, until he noticed the other crew members using theirs. He was also told by crew member Richard Delwiche that his shelter was better than nothing.

3. Statements from all three crew members showed signs of difficulty when trying to pull the red tabs on the plastic cover surrounding the shelter. The red tabs were compressed to the plastic covers.

The crew members were wearing gloves and felt this to be a contributing factor of not being able to gain access to the tab and slowed the process of deploying their fire shelters.

4. The heat from the fire caused the aluminum portion of the shelters to discolor, burn and separate from the interior portion of the blanket.

5. The heat from the fire caused discoloration and burn on the interior of the fire shelter, however, the interior was not damaged to the same extent as the exterior, providing added protection to the crew members.

6. Further investigation showed the shelters deployed by the crew members had holes along the seams and folds from pencil hole size down to pin hole size. The deterioration was not caused by heat, but rather by everyday wear and tear.

7. Manufacturing dates on the fire shelters used by the Organized Crew members were destroyed in the fire.

RECOMMENDATIONS:

1. Investigation team suggests all recommendations be considered by the USFS Regional Fire Equipment Committee and the CDF Safety Committee.

2. Continued improvement through testing, manufacturing and packaging. The quality of the fire shelter may be reduced by deterioration along the seams and folds through everyday use.

3. Some training should include actual deployment of fire shelters in areas where like fire conditions may occur (not always on the station or camp lawn). Shelters replaced because of wear and tear or outdated can be used for this training.

4. Increase of individual fire shelter inspections locally to determine if unsafe, due to wear and tear or shelters that may be grossly outdated. Obvious signs of deterioration during an inspection might be flaking of the aluminum, separation between interior and exterior lining or pin holes along seams and folds.

5. Routinely train all individuals on proper fire shelter deployment and safety precautions. Inform those individuals not to bend, lean, sit or lay on their shelters which adds to shelter deterioration.

6. One crew member stated he felt added stress during the accident because he could not communicate with the other firefighters once they were in their shelters. During shelter training it should be pointed out that communications between individuals that have deployed their shelters is helpful.

7. Provide for a time period where fire shelters will be replaced because of shelf life deterioration. Also recommended that replaced fire shelters can be utilized for training.

8. It is further recommended that instead of carrying the fire shelters in a folded manner that the shelters be rolled. This may reduce the number of holes and tears because of the decrease in the amount of folds. In its present state it would be difficult not to have the three major folds in the shelter, however, from that point if you were to roll the shelter you would decrease tha amount of small folds that help to deteriorate the shelters from everyday wear. It should further be pointed out that the shelters should be worn on the side of the carrier or in such a place to reduce the wear caused by bending, sitting or laying on the shelters, but not reduce the efficiency of deploying them.

PROBLEM STATEMENT #2

SUBJECT: Use of Organized Crew in CMP Burn
As a Training Exercise

STATEMENT OF FACT:

The Mendocino National Forest has been using the 40 hours of paid training as approved in the A. D. Pay Plan per firefighter per season throughout the fire season. The spread out use of this money is to take advantage of conditions to train the crew in as actual an environment to firefighting as possible. Also, it is used to keep proficiency high throughout the fire season and to keep up crew interest in "slow" fire seasons.

In the past, the 40 hours have been paid at the beginning of the fire season for classroom training and actual fire assignments were used for additional training. These crews agreed to take the classroom training for college credit only and use the paid time for actual in-the-field training.

This was the first time the training assignment included burning. All other training has been building or improving hand line on timber sales or chaparral management projects before the actual burn. As a result of the feeling that this was a training assignment, the crews were on site with a Forest Service Crew Coordinator as an instructor and only one Forest Service personal portable radio, the only one on the fire line. One CDF Handie-Talkie was given to the Davis Organized Crew for communications with CDF forces.

They were properly and completely equipped with tools, chain saws and personal protective equipment.

Up to the point of the burn escaping the control lines, the crew was using this opportunity to increase their skills in line construction, and holding. In addition, they were receiving training in the use of water on the fire line from the CDF engine crews. The one Crew Coordinator, who is a red carded Strike Team Leader - (Crew), was sufficient for the training aspect, but when the fire escaped, supervision and communications stretched to thin.

When the burn escaped, the CDF placed a fire order for the crew and immediately started using them as a suppression force. The lack of sufficient red carded supervision resulted in the squad that was working on the west end of the fireline to be without proper supervision. The Crew Coordinator could see problems brewing in this area and started toward the problem area. He was able to get word to part of the crew to leave the area, but could not contact the three crew members who had to deploy their shelters.

RECOMMENDATIONS:

The accident investigation team (and other CDF people in Butte County) feel that the "hands-on-training" concept started by the Mendocino National Forest should continue and provides valuable experience for the Organized Crew members. However, a policy

should be instituted that if these crews are to be trained on any incident where a burn is taking place at the time of training, the crew should be equipped and staffed as if it were responding to a fire. This would include proper supervision and communication equipment. Increased supervision and communications were needed in this case.

PROBLEM STATEMENT #3

SUBJECT: Attitude difference between prescribed fire and wildland fire and pressures to complete the CMP Burn

STATEMENT OF FACTS:

There was stress to get the burn completed.

Crews do not have the same level of adrenalin under prescribed fire compared with wildland fire which develops a feeling that a prescribed fire is "safe".

Burn was scheduled for 1000 hours, but because fire line was not ready, it did not start until 1200 hours.

Signs observed at the accident scene indicated that the control line was not ready for firing.

Go - No Go checklist or decision to cancel one day was not used.

SUPPORTING DATA:

Hamlin CMP was started on September 2 with the thought that if they could, the entire CMP burn would be done in one day. There was spotting the first day which took time and crew energy to contain. The decision was made to split the burn into two days, and complete the burn in Hamlin Canyon the second day.

There appears to be a different attitude between the crews and some supervisors that, if it is a "controlled burn", then it is safer and the safety guard is dropped somewhat on the fire line with prescribed fires.

The second day burn was scheduled to begin at 1000 hours, but the West fire line of Hamlin Canyon was not completed and ready for firing. A digger pine had been felled three days earlier and all the limbs needed to be lopped and removed before the burn could proceed. This was the Organized Crew's assignment that morning. Not all of the slash had been removed when the firing occurred and what had been removed was piled on the scheduled black side of the line. Slash was remaining under the 15 foot bluff, which caught on fire and cut off the safety route for the three fire-fighters on the bluff. Duff and litter remained on the upper portions of the West Hamlin Canyon firebreak. This added to the heat and fire around two of the crew members that deployed their shelters. One was forced out of his shelter because of ground fire under his shelter which burned his knee and calf.

Wind conditions were 8-10 MPH from the North with gusts of 12 MPH. There was an up canyon wind due to thermal heating of the valley below flowing up Hamlin Canyon. This wind increased because of the 2 hour delay in starting the burning.

With the North gradient wind flowing over the up canyon wind, it caused erratic wind conditions in the canyon. The wind changed directions several times in the canyon prior to starting the burn.

The prescription called for a North wind to keep the smoke out of the town of Paradise.

RECOMMENDATIONS:

1. Do not let crews become complacent about safety on prescribed fire.

2. Management should feel free to cancel the burn when weather, time, site or control lines are not ready for firing.

3. Supervision and communications for crews to be planned around wildfire potential to assure crew safety.

4. When clearing fire line, brush should be piled on green side of line, not black side.

PROBLEM STATEMENT #4

SUBJECT: First Aid and Evacuation

STATEMENT OF FACT:

The three victims received burn injuries--two of the three additionally received smoke inhalation, and one received eye injuries. All three received first aid at the scene and were then evacuated by helicopter to the Chico Airport where they were transported by ambulance to Chico Community Hospital Burn Unit.

SUPPORTING DATA:

At the time the injuries were sustained, a CDF engine was on the dozer road near the bottom of the canyon. Two of the crew members held current EMT status and did respond with a burn kit to the location of the injured, and provided first aid and assisted in the evacuation of the injured.

The presences of these two EMT's points out the need and importance of providing EMT training to selected CDF and Forest Service personnel. Both agencies are toiling with the question of how much EMT training should be given. In this case, the EMT trained and equipped people were within 200 yards of the accident scene. Had the injuries been more severe, they would have been able to provide immediate medical attention.

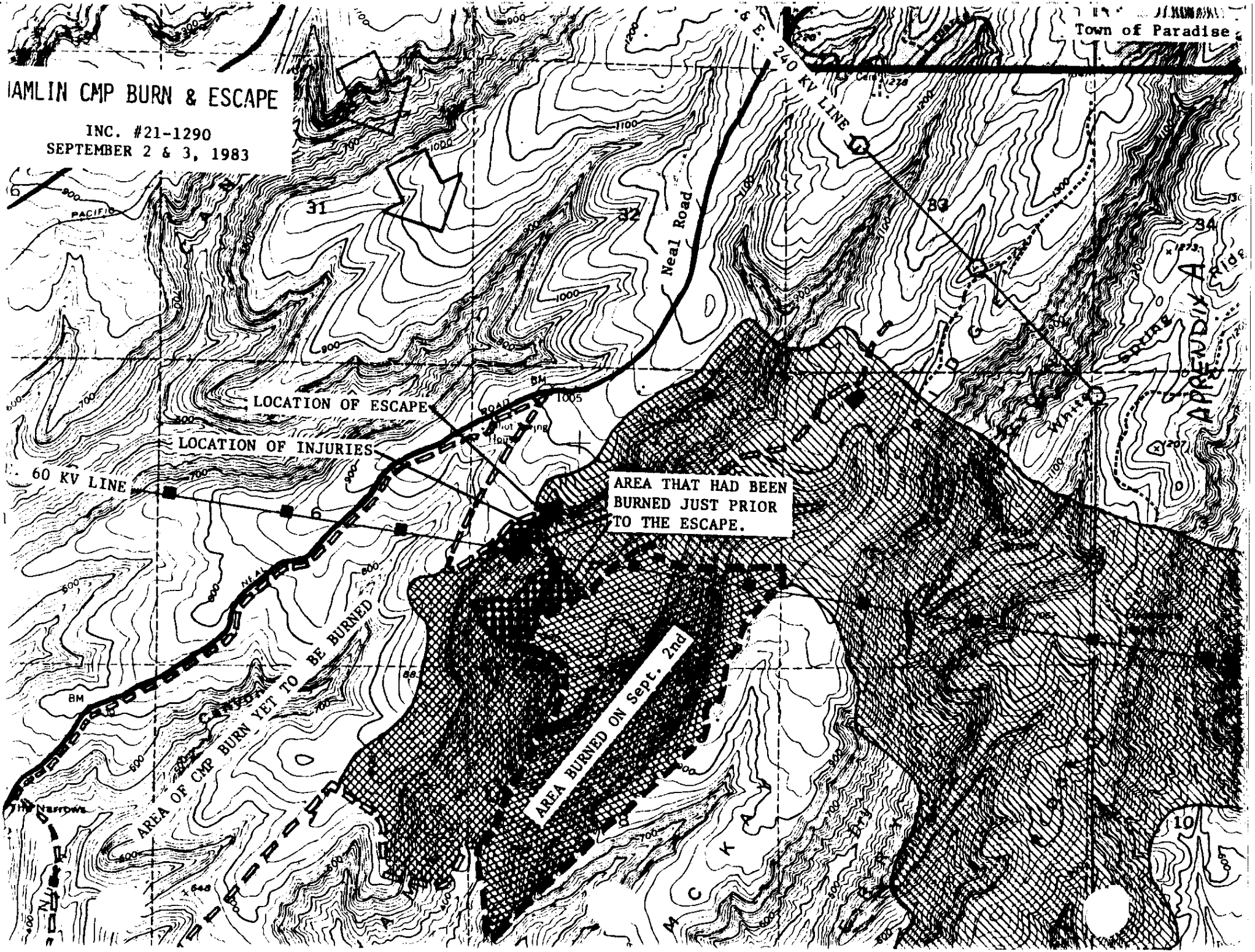
RECOMMENDATIONS:

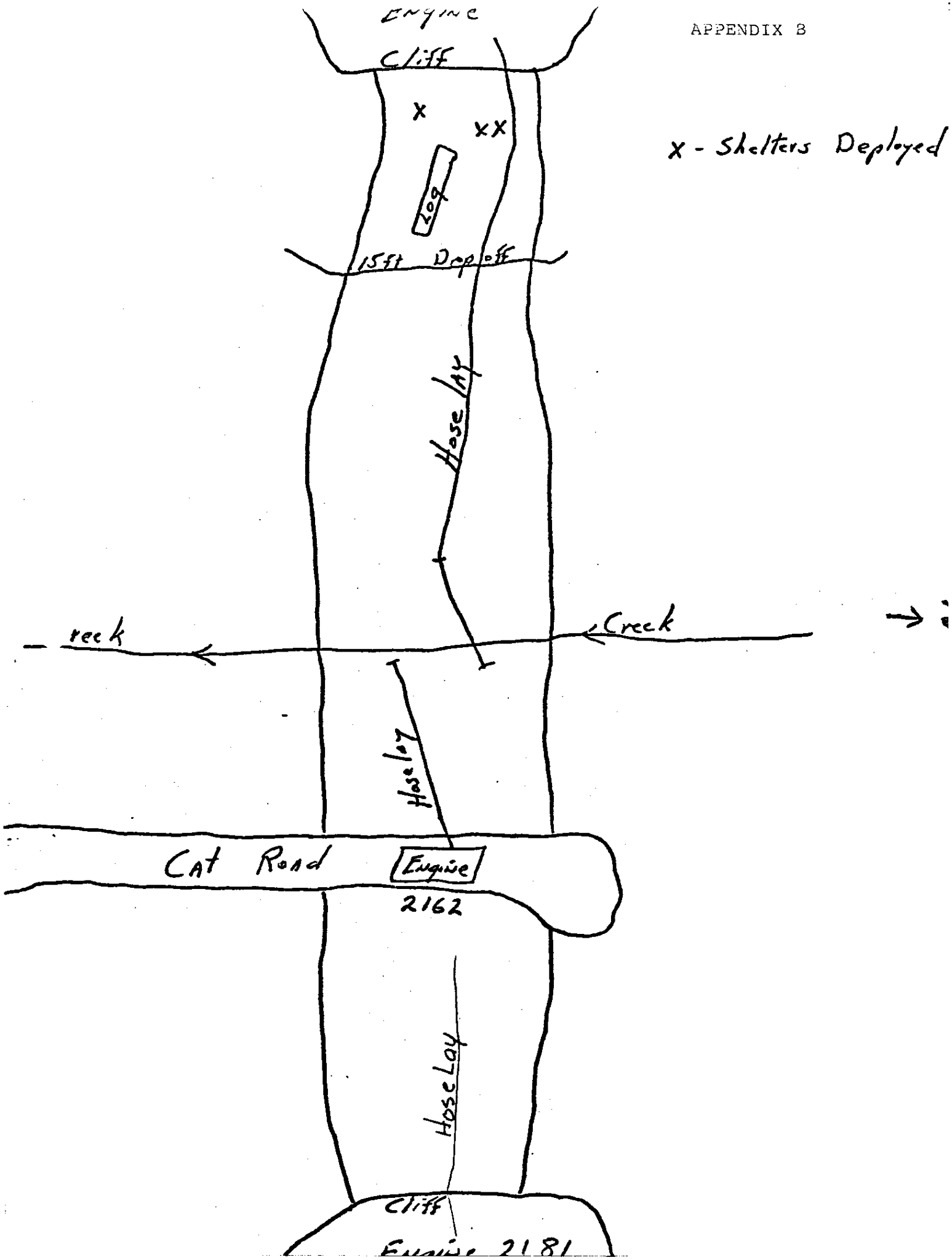
It appears that the benefits of training CDF and USFS selected personnel as EMT's would far outweigh the costs of more severe fire line related injuries.

UNRESOLVED QUESTION

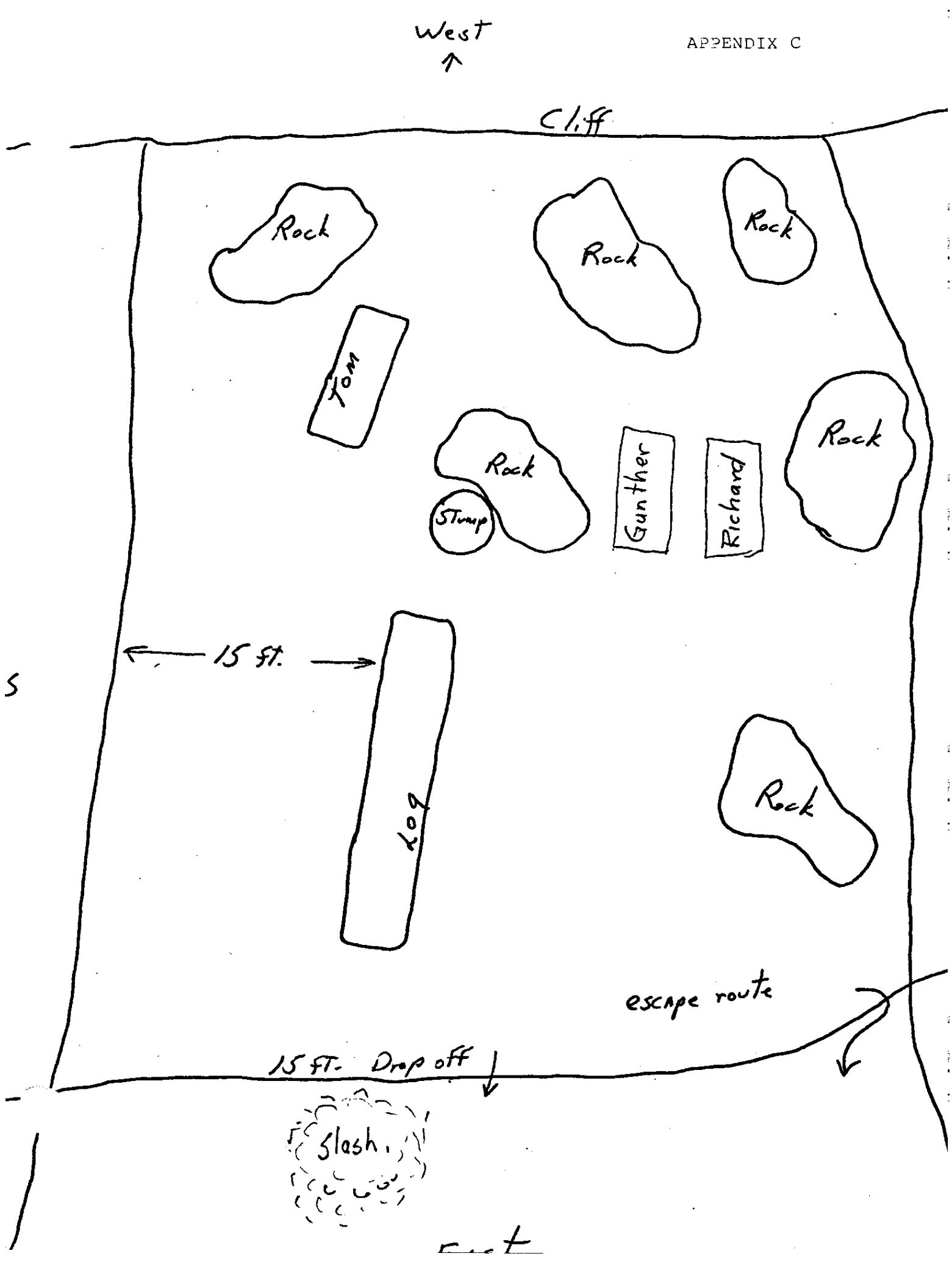
Throughout all the interviews, one item remains unanswered. That is, what caused the spot fire at the bottom of the canyon after the East side was burned? Some witnesses say that it was fire brands; other equally qualified people stated it was a hang fire from the helitorch operation. Nevertheless, it was a fire that burned up the West side and caused the need to start the firing operation sooner than the firing boss wanted to. This is mentioned just to point out that a conflict in witness information exists.

The accident investigation team would like to commend everyone involved with this investigation for their cooperation and openness. Everyone involved in this incident was interested in what happened, what would be learned from it, and how to prevent a similar accident.


HAMLIN CMP BURN & ESCAPE
INC. #21-1290
SEPTEMBER 2 & 3, 1983
Town of Paradise
E. 240 KV LINE
Neal Road
LOCATION OF ESCAPE
LOCATION OF INJURIES
60 KV LINE
AREA THAT HAD BEEN BURNED JUST PRIOR TO THE ESCAPE.
AREA OF CMP BURN YET TO BE BURNED
AREA BURNED ON Sept. 2nd
APPENDIX A
PACIFIC
The Narrows
BM
1005
31
32
33
34
10



X - Shelters Deployed


West
Cliff
Rock
Rock
Rock
Tom
Rock
Stump
Gunther
Richard
Rock
15 ft.
Log
Rock
escape route
15 ft. Drop off
Slash
S
East