

CART CREEK FIRE

INVESTIGATION REPORT

John C. Barber, Chief Investigator

Lynn R. Biddison

Craig C. Chandler

Frank A. Ribeiro

CART CREEK FIRE INVESTIGATION REPORT

Table of Contents

	Page
I. INTRODUCTION	1
II. FIRE ENVIRONMENT	2
A. Location	2
B. Topography	2
C. Fuels	2
D. Weather and Fire Danger	3
III. CHRONOLOGY OF EVENTS	4
A. Fire Discovery	4
B. Initial Attack and Reinforcement	5
C. Situation at 1450 and Change in Fire Behavior	8
D. Crew Behavior	8
E. Subsequent Action	11
IV. FIRE BEHAVIOR	13
V. ORGANIZATION AND MANAGEMENT	15
A. Crew Organization	15
B. Qualifications and Experience	16
C. Logistical Support	20
D. Aviation Management	20
E. Compliance with Ten Standard Orders	20
VI. INVESTIGATION.....	22
VII. FINDINGS.....	25
VIII. APPENDIX	
A. FIRE WEATHER FORECASTS AND FIRE DANGER OBSERVATIONS ...	27
B. MEDICAL EXAMINER'S FINDINGS AND BLOOD SAMPLES	34

I. INTRODUCTION

This report describes the circumstances resulting in the fatal accidents on the Cart Creek Fire, July 16, 1977, Flaming Gorge Ranger District, Ashley National Forest. The forest fire over-ran and killed three Forest Service personnel; they were:

Gene Campbell, Forestry Technician, GS-9, age 57.

David K. Noel, YCC Camp Director, GS-9, age 36.

Dwight E. Hodgkinson, Forestry Aid (Seasonal), GS-2, age 23.

The fire began about noon from a lightning strike and was burning in low sagebrush and grass with scattered areas of mahogany and bitterbrush, and scattered junipers and ponderosa pine. At about 1455 the fire suddenly intensified, changed direction, and drove forward in an intense headfire toward three squads building fire-lines. The fatalities occurred in two separate accidents within a few seconds after the change in fire intensity.

The Regional Office was notified of the fatalities and in turn they notified the Washington Office. The Regional investigating team consisting of Claude Elton, Deputy Regional Forester for Administration; Dean Lloyd, Director of Fire and Aviation Management; and Richard Leicht, Director of Cooperative Forestry and Fire, arrived at the Supervisor's Office about 2040 and began the investigation. A Washington Office investigation team of John C. Barber, Associate Deputy Chief, State and Private Forestry; Lynn Biddison, Director of Fire and Aviation Management, R-3; and Frank Ribeiro, Safety Officer, arrived in Salt Lake City the evening of July 17 and reached the Supervisor's Office at 0920 July 18. Craig Chandler, Director of Fire Research, WO, joined the team later in the day. Elton and Leicht were asked to join the WO team and Dean Lloyd was excused because of the press of other fire activities in the Region. The investigation was conducted on the Flaming Gorge District, July 18 - 20. A brief was prepared and transmitted to Regional Foresters and Directors by the Chief of the Forest Service, August 4, 1977.

II. FIRE ENVIRONMENT

A. Location

The Cart Creek Fire began around noon on Saturday, July 16, 1977, below a lightning struck tree in Section 21, Township 2N, Range 22E, Uintah Meridian, Flaming Gorge Ranger District, Ashley National Forest. The point of origin was about 4/10 mile south of the confluence of Cart Creek and Spruce Creek and some 2 miles southwest of Flaming Gorge Dam.

The triangle of land where the initial fire action took place is bounded by Cart Creek Canyon, a 200-foot deep gorge draining from southwest to northeast; by the Spruce Creek drainage, a steep but not deep gully draining from southeast to northwest; and by a 10-20 foot high broken rocky bluff running roughly west-southwest from the rim of Cart Creek Canyon. From the tip of the triangle, where the two creeks meet, to the top of the bluffs is one-half mile (Figure 1). The total area in the triangle is 100 acres and only the southwest half of this was burned or burning at the time of the accident.

B. Topography

The first two-thirds of the distance from the tip of the triangle to the bluffs is relatively flat--average slope 8 percent. Then the land tips upward gradually for the last 800 feet with a slope of 17 percent just above the fire origin and 45 percent just below the bluffs. The elevation at the top of the bluffs is 6700 feet, and at the creek junction, 6000 feet. Two or three shallow swales run north out of the bluffs and disappear in the flat.

C. Fuels

Fuels over the entire fire area can be characterized as extremely flashy grass-sage with scattered junipers and



ponderosa pines and clumps of bitterbrush and curly-leaf mahogany in the swales and pockets of deeper soil." In general fuel volumes increased with elevation, estimated averages being 4 - 6 tons per acre in the lower flat and 8 - 10 tons per acre at the base of the bluffs. Even the heaviest brush clumps in the southwest corner only averaged 12 - 16 tons per acre.

D. Weather and Fire Danger

The Saturday morning forecast from Salt Lake City, issued at 0930, called for partly cloudy with scattered afternoon showers and thunderstorms. Winds were forecast to be "light and variable at all levels, mostly controlled by topography. Considerable gustiness in late afternoon and near showers and thunderstorms." This forecast was essentially correct, but the cumulus buildups began slightly earlier than expected. Salt Lake City weather radar began tracking thunderstorm cells shortly before 1100 moving with a 20 - 25 knot southwest wind. Thunderstorm activity increased throughout the afternoon, resulting in a 1515 flash flood watch for southwestern Utah, but the center of activity shifted gradually south and winds aloft above central Utah swung very gradually towards the west.

In the fire area a storm passed over before noon, producing the lightning that caused the fire, but dropping most of its moisture to the north and east. The fire area itself received no more than a sprinkle, and may have stayed completely dry. By 1230 the sky had cleared and the afternoon remained clear with only scattered cumulus.

From at least noon through 1455, winds at the fire site were light (6 miles per hour or less) and out of the southeast (downslope). This sustained southeast flow at ground level is difficult to explain. Normally afternoon winds in the area are from the south. The winds aloft were southwesterly, and the combination of topography and gradient flow should have produced generally westerly, not easterly wind. Downslope winds could be expected following the thunderstorm, but for them to persist for at least 3 hours when the cells were moving at 20 miles per hour would be most unusual. If

the winds came from downdrafts out of a series of cells, one would expect much more gustiness and sudden wind shifts than were evident in the early afternoon. But, whatever the cause, the fire area, experienced light, steady southeast winds from noon to 1500.

The local fire danger on Saturday was officially listed as "moderate" with a burning index of 6 and a spread component of only 1. This is misleading, however, since the official fire danger rating station is 400 feet lower than the fire, on the other side of the reservoir, and received considerable moisture from the morning shower. A more representative reading would be that from the Dutch John Airport, at the same elevation as the fire and only 3.5 miles NE of the point of origin. At 1330 the airport weather was temperature 78°F., relative humidity 33, fuel stick moisture 9 percent, and wind SE at 6 miles per hour. At that time the burning index on the flat was 12 and the spread component was 3. On the upper slopes of the fire the spread component was 5. The Appendix contains the pertinent weather and fire danger observations.

III. CHRONOLOGY OF EVENTS

A. Fire Discovery

The fire began about noon Saturday, July 16 from a lightning strike on a bench (elev. 6400 ft.) south of the confluence of Cart Creek and Spruce Creek. The wind was blowing gently downslope to the northwest and toward Cart Creek. District FMO Dennis Hatch saw smoke from the fire, drove as close as possible, parked his truck just off the highway, and walked to the west rim of the Cart Creek Canyon where he could see the fire; at that time (1210) he estimated it to be about one-half acre. He called for the helitack crew based at Dutch John Airport, 3 1/2 miles northeast, to initiate attack and then went to Cedar Springs Lagoon, about

1 mile north of the fire where he could be picked up by the helicopter. Meanwhile the District Office received several phone calls reporting the smoke.

B. Initial Attack and Reinforcement

The helicopter had returned from a fire on the Caribou National Forest at about 1130 but several of the crew members and the fuel truck were still en route from Idaho. Other crew personnel had gone home to get cleaned up or to get lunch; they were contacted by the District Office and responded immediately. The helicopter placed a two-man initial attack crew near the fire at about 1235. The two men, Dave Dumas, assistant helitack foreman, and Chuck Miner, forestry technician, were instructed by helicopter foreman Don Black to wait until additional help arrived before beginning initial attack. The fire was about 1 1/2 acres in size at this time. The helicopter then went to Cedar Springs Lagoon, picked up Hatch and firefighter Rich Harned, made an aerial reconnaissance of the fire, and placed Hatch and Harned on the ground at the same helispot (H-1) (Figure 2). Hatch recognized that the small available squad could not control the fire promptly and radioed for a retardant drop and 20 additional firefighters. The fire was spreading slowly uphill against the wind and was moving more rapidly with the wind downhill and west toward Cart Creek Canyon. Hatch took Miner and Harned, walked partway up the slope to a point near the origin of the fire, and began building an unanchored line uphill to the south. Dumas was left at the helispot to handle incoming personnel. Helitack foreman Black set up a heliport at Cedar Springs Lagoon.

Many District personnel were attending a rodeo at Manila, about 30 miles away. The District Office contacted the rodeo site and a call was made over the loudspeaker system for all District personnel to report to the gate. They were informed of the fire and the need for firefighters. Most of them had to stop by their homes to change clothes and gather equipment. Other District



personnel were also alerted and instructed to report to the Cedar Springs Lagoon for transport to the fire site.

Tom Plasky and Dave Strantz were placed on the fire at about 1300 and joined Hatch's squad. The strategy was to build a line along the east flank of the fire uphill and then swing west to cut it off before it reached the ridgetop. The squad worked close to the fire and could knock it down quite easily. The helicopter returned to Dutch John Airport for a load of tools and water. In the meantime, the fire had been moving downhill and slowly to the east across a flat causing the helicopter pilot to move his helispot further east (H-2) to provide more distance from the fire. The tools and water were dropped at this helispot

At about 1340 Barry Sheakley and John Uphoff arrived over the fire and Sheakley instructed the pilot to circle so that he could appraise the situation. Recognizing the desirability of cutting off the fire at the ridgetop, Sheakley had the helicopter place Uphoff and him on the ridge above the point where Hatch and his squad were building line. Sheakley established voice contact with Fire Boss Hatch. They discussed the situation and Sheakley and Uphoff began to build a second section of unanchored fireline across the ridge. Hatch sent Strantz and Plasky up to assist Sheakley in building this line. The next helicopter trip, about 1350, unloaded Karen Coleman, Yolanda Jenkins, and Dwight Hodgkinson at H-2 and they began walking uphill to join Hatch's squad. At about 1400 a DC-6 airtanker carrying 2500 gallons of retardant arrived over the fire and made several runs dropping retardant on heavy fuel along the ridge line and on hot spots along the edge of Cart Creek Canyon, west of Hatch's position. During the airtanker drops, the helicopter was not operating. While the airtanker was in the area, Jenkins, Coleman, and Hodgkinson arrived on the line to join Hatch's squad. Hatch felt they were needed in Sheakley's squad so he sent them up on top. This gave Sheakley a total of six people plus himself. Shortly after this, it was necessary to return Plasky and Strantz to Hatch's squad as the fire was more

than he and two men could handle.

During this period a number of persons had arrived at the Cedar Springs lagoon helispot, among them YCC Camp Director Dave Noel who began organizing crews. After the retardant drops, the helicopter made several quick runs ferrying four people each time. The first load carried Dave Noel, Ray Purdy, Geary Searfoss, and Darrell Parks. The next load was Dave Simpson, J. Martin, Pat Crevelt, and Caret Jackson. From these two loads J. Martin drew a four-man squad consisting of Crevelt, Searfoss, Simpson, and himself; and at Noel's direction proceeded from H-2 up the slope to a point east of the initial attack point, but on another ridge. During the interval since first attack the fire had burned east around the initial attack point and had outflanked Hatch's line.

Noel had radio contact with Hatch, had discussed the situation, and had picked a point where Martin's squad was to begin building a third section of unanchored line. He had walked from the helispot toward that point with Martin's squad, and then returned to the helispot to instruct Purdy and his squad. Martin and his squad were to build a fireline uphill and then cut off that segment of the fire by tying into Hatch's line.

A second squad had been formed but had to wait for another helicopter trip. After delivering the load containing Purdy, the helicopter pilot instructed Dumas to move the helispot about 65 yards farther east away from the edge of the fire. The next load came to this new spot (H-3) and consisted of Ray Ruble, Val Norman, Gene Campbell, and Annette Rogers. Purdy had been designated leader of this squad and after receiving instructions from Noel to begin at the low end of Martin's line and build downhill, Purdy and his squad left for the fire with most of them walking in file. The squad consisted of Purdy, Roble, Jackson, Parks, Norman, and Rogers. Norman had been designated as a line scout for Purdy's squad. The distance from the helispot (H-2), where they had picked up their tools to the fireline was about 250 yards. It was across a relatively flat area of sagebrush and grass with a few scattered trees. There was

a slight draw that contained heavier fuels to the east of the burning edge of the fire. Noel and Campbell were walking about 15 or 20 yards behind the last member of Purdy's squad.

C. Situation at 1450 and Change in Fire Behavior

As Purdy's squad walked toward the fire, they moved across the flat and draw, and were walking upslope roughly parallel to the burning edge of the fire. During this time the helicopter had returned to H-3 and dropped Rick Martin, who was to join one of the squads. The helicopter was running low on fuel and remained on the ground briefly while Dumas discussed the fuel situation with Black and the pilot. Black has accompanied the pilot on this trip inasmuch as he had only one passenger. The helicopter then lifted off and within less than a minute, the fire intensified abruptly along the full length of the line. The personnel in the helicopter recognized that the fire was intensifying and called on the radio to alert people on the ground that something was happening. It had also been noted by J. Martin's squad that in the few minutes that they were building a total of 63 feet of line, they had had to drop back twice because of increasing heat from the fire in what appeared to be relatively uniform fuels. At this time Sheakley's squad had completed 167 feet of line across the top of the bluff and were just preparing to drop over the edge to tie to Hatch's line which had been completed to within about 150 feet of the top.

Near the ridgetop Hatch had noted some increasing intensity of the fire as it moved into the heavier fuels and had sent a message up to Sheakley's squad to be alert. The message was not understood and Sheakley came off the ridge to a rocky point where he could talk directly with Hatch. Sheakley and Hatch discussed the situation for a moment or two and felt that they would be successful in tying their two lines together to cut off the head of the fire.

D. Crew Behavior

Suddenly the fire intensified and Sheakley instructed his

squad to drop back off their line. They then moved a short way down the ridge to the east. Sheakley was separated from his squad by a rocky bluff, varying from 10 to 20 feet high, but called instructions out to them and they proceeded in an orderly fashion. Within a few seconds he realized that this was more than a simple increase in intensity due to fuel changes, but that the fire had changed behavior drastically and was moving toward them at a very rapid rate. He instructed his squad to come down the bluff. They ran along in single file for a 5-chain distance to a point where they could come down through the rocks. Sheakley was below them and in voice contact at all times. As they retreated, the order in line was Uphoff, Coleman, Hodgkinson, and Jenkins. When they came down the rock face Hodgkinson stepped aside and told Jenkins to go ahead of him. He then came down the rocky slope immediately behind her. Word was passed to drop their tools and run. As they came down the rocky slope each crew member dropped his tool in an orderly fashion and ran toward an opening in the fire created by Hatch's line and into the burned out area. Hodgkinson was the last person in line and did not come through behind the other crew members. Immediately they called to him but got no response.

Meanwhile the helicopter had moved overhead and observed Hodgkinson running a few yards behind Jenkins when a juniper suddenly flared. The eyewitness report of the helicopter pilot, Rick Inskeep, was that Hodgkinson stopped, paused momentarily, turned around and began to run back to the point where he had descended from the ridge. Helicopter Foreman Black, sitting in the seat opposite the pilot, saw him only after he had started running back toward the ridge. The helicopter dropped low over him, and Black and Inskeep tried to get his attention to turn him around to follow other crew members through the opening in the fire. They believed that time was adequate for him to reach safety. As he struggled up the slope Hodgkinson apparently became disoriented, and was stumbling and falling among the rocks when obscured by smoke. The fire rolled over his location. The helicopter pilot, recognizing that he



could no longer be of any help to Hodgkinson, swung immediately to the low end of the fire to see what was happening there. He had observed that the fire had erupted along the entire line almost instantaneously.

Hatch's squad moved back from their line when the fire intensified, then recognizing the situation and responding to directions, moved through their line into the burned out area and safety. Sheakley's squad joined them very quickly.

Further down the hill as the fire intensified, J. Martin's squad began to move back from their line but after looking around them and seeing fire coming from below, Martin instructed his squad to move across the line to safety in the burned area.

Purdy was just reaching the low end of Martin's line and deciding where to start building his line downhill. There was a small unburned area at the low end of Martin's line where the fire had gone out. When Purdy looked back into the draw behind him and into the flat all he could see was a wall of fire; he yelled for his squad to move ahead rapidly through the hole below Martin's line and into the burned out area. Other members of his squad yelled similar warnings. All members of the squad ran forward and into the burned area.

Campbell and Noel were last seen about 15 to 20 yards behind Annette Rogers, the last member of Purdy's squad. None of the squad members who looked back after the fire erupted saw Campbell and Noel, only a wall of flame variously described as 10 to 30 feet high. Campbell and Noel were apparently cut off from Purdy's escape route and turned south up a low stony ridge and attempted to outrun the fire. From our best estimate of their position, they ran up the low ridge about 50 yards then turned northeast toward the helispot and continued running. While we were unable to fix the exact point from which they began their run, canteen, radio, and tools established their line of retreat. After turning toward the helispot, Noel moved about 20 yards and Campbell about 35 yards before falling.



Dumas heard Black's original alert on the radio and he and Rick Martin moved from H-3 up to H-2 where they could see what was happening. The first thing noticed by Dumas was fire flaring up in a pine near where Noel and Campbell were running. Martin saw both Campbell and Noel running toward the helispot after they had turned and saw them fall at about the same time. Dumas did not see Noel but did observe Campbell. After falling Noel did not move. Campbell struggled to get up and then opened a canteen and began pouring water over himself before the fire rolled over him. The fire was burning with very high intensity as evident by the complete consumption of fuels and by spalled rock in the vicinity of both bodies.

Dumas and Martin then realized that the fire was moving toward them and began to run north toward Spruce Creek. Just as they reached the edge of the dropoff into the creek the helicopter pilot saw them, landed his helicopter between them and the fire and lifted them out. Because he was short of fuel he flew across Spruce Creek, put them down, and returned to the fire to see if he could help.

E. Subsequent Action

As Purdy's crew moved into the safety of the burned over area, they realized that both Campbell and Noel were missing and began shouting their names, but got no response. The fire was burning with such intensity that it was impossible to move in behind the burn for several minutes. As soon as the heat reduced enough, three persons wet down their fire shirts, put wet handkerchiefs over their faces, and started a search for Campbell and Noel. Both men were dead when found a few moments later. The heat was still intense in the area and the searchers had to withdraw and wait additional time for the area to cool down.

At the top of the slope Hodgkinson had been missed immediately and the search went out for him as soon as the area had cooled enough. He was found face down in the area where he had originally come down the rock bluff and within a few feet of

the remains of the tools dropped by the crew members. When the helicopter returned to the area, Don Black was informed of the fatalities.

Herb Cummings, the District Resource Forester, had arrived on the rim of Cart Creek Canyon at about 1430 and had been observing the fire and the crews on the fireline. He was in radio contact with Hatch but had not detected any noticeable change in fire behavior prior to the sudden intensification. It was his opinion that the firefighting was proceeding in an orderly manner and accomplishing the strategy laid out to flank the fire on the east side, and then cut it off before it reached the ridgetop. When the fire erupted and began its rapid spread, Cummings recognized that the fire was now out of control. He immediately ordered five 20-men crews, one overhead team, a 300-man camp, radio kit, helitack kit, and additional supplies. Additional retardant drops were ordered and a helispot was established at Green Dale Campground which was to be the fire camp location. Additional helicopter support was also requested.

Cummings then drove down to Cedar Springs Lagoon and walked over into the fire area with District Ranger John Combs. They were met by crew members who informed them of the accidents.

The Supervisor's Office was notified and in turn notified the Sheriff of the accident so that the bodies could be removed from the site. The Region was notified of the fatalities and in turn notified the Washington Office. An investigation team was organized immediately in the Region and dispatched to the fire site. The Washington Office Investigation Team was organized and left Washington the following day.

No autopsies were performed but the medical examiner had blood samples taken for analysis. The results of these analyses are contained in the Appendix to this report.

There were no injuries or burns to any of the other firefighters. The fire was about 50 acres when it intensified and made its run. The next available map, an IR scan at 0130 on July 17, showed 940 acres within the perimeter. The Cart Creek Fire was controlled at 1800 hours July 18 at 1480 acres.

IV. FIRE BEHAVIOR

To recapitulate a bit, from first attack to the time of the accident, the manned section of the Cart Creek Fire was backing uphill on a 17 to 45 percent slope in sage-grass fuel. The weather forecast called for winds to be controlled by topography with considerable gustiness in late afternoon. However, the actual winds were blowing lightly but steadily downslope. Even so, parts of the fire were too hot to work directly at the edge of the flames, and line was being built 5 - 10 feet from the fire edge.

From the arrival of the first firefighters at 1235 until approximately 1430 to 1445, fire behavior remained constant and fuel controlled. Fire intensity increased proportionally to the fuel volume and flames were 6 - 18 inches high on the flat, about 2 feet high at midslope, and quite variable in the brushy patches below the bluff. Spread rate of the backing fire was controlled by fuel continuity and the amount of grass in the grass-sage-brush mix. Consequently, the fire on the flat moved eastward faster than it did on the brushier slopes.

Sometime around 1440 things began to change. Martin's squad had to move their line further back from the fire twice in 10 minutes because the original line "got too hot for comfort" even though there was no change in fuel or slope. The reasonable inference is that the steady southeast wind that had been blowing for the past few hours was beginning, not to shift, but to weaken. The fact that the lower helispot (H-2) was moved further east (H-3) some 15 - 25 minutes before the flames shifted is also evidence that the fire on the flat was either quite a bit to the east of the fire flank on the middle slope, or that the fire on the flat was beginning to burn more intensely, or both.

On Wednesday, July 20 the investigation team observed test fires in unburned islands within the fire area. Weather was reasonably comparable to that of Saturday the 16th although the wind was 6 miles per hour from the northwest rather than the southeast. In these fuels the difference between fire head and rear under a 6 mile per hour wind were dramatic. Flames at the head were 6 - 8 times the length of those at the rear and the flame angle at the head was less than 30 degrees from the ground surface|

while that of the rear was nearly 45 degrees. Spread rate differences could not be measured since no islands were large enough for fires to reach equilibrium, but theoretically, using the grass fuel model, one would expect the difference to be a factor of at least 20 - 25.

At 1455 on July 16 the downslope wind gave out. It was probably replaced by a light upslope wind of 6 miles per hour or less, but this is not certain. Although many of the witnesses reported "a sudden change of wind," it developed during the interviews that none of them, with two exceptions, had felt any wind. All had inferred a wind switch by observing the change in direction of the flames. The timing of the reports of the two eyewitnesses who felt strong winds was such that the winds could have been fire induced. Based on the test fire observations on Wednesday, a wind change from 6 miles per hour downslope to 6 miles per hour or less upslope on the 17 percent slope would, within seconds, change the flame lengths from 2 - 3 feet to 14 - 21 feet and start an exponential acceleration in rate of spread. That is what happened. The entire east flank of the fire picked up and moved southeast as a wall of flames. The lower edge of the line, being in flashier fuels and somewhat farther east to begin with advanced most rapidly, while the upper edge of the fire, being in heavier fuels and on a steeper slope moved more nearly southerly than southeasterly. Flames funneled through the heavier fuels in the swales and created an intense concentration of heat, first on the west side and later on the east side of the rocky toe over which Noel and Campbell tried to escape. Along the bluffs fire behavior was more erratic as the full sweep of the fire induced, as well as any "natural," winds eddied against the broken bluffs. Some patches of brush burned hot and clean, some escaped completely. The pattern seemed to be random.

Although the possibility that this abrupt change in fire behavior was caused by a cumulus downdraft cannot be completely ruled out, it is very unlikely. The wind shift was not really sudden; there were signs that the downslope wind was weakening at least 15 minutes before the flames shifted direction. It is most likely that the weather forecast for winds "...mostly controlled by topography. Considerable gustiness in the last afternoon..." was simply a bit late in being realized. Fire behavior on the Cart Creek Fire can best be classed as unusual but not abnormal for the fuel, weather, and topography involved.

V. ORGANIZATION AND MANAGEMENT

A. Crew Organization

Organization Fire Boss

Dennis Hatch

Squad Boss
Dennis Hatch

Squad Boss
John Martin

Squad Boss
Ray Purdy

Squad Boss
Barry Sheakley

Chuck Miner
Rick Harned
Tom Plasky
Dave Strantz

Pat Crevelt
Geary Searfoss
Dave Simpson

Ray Ruble
Carel Jackson
Darrel Parks
Val Norman
Annette Rogers

John Uphoff
Karen Coleman
Yolanda Jenkins
Dwight Hodgkinson

No Specific Assignment in the Suppression Organization

Dave Noel - Assignment unknown
Gene Campbell - Assignment unknown
Rick Inskeep - Helicopter Pilot
Don Black - Helicopter Foreman
Dave Dumas - Assistant Helicopter Foreman
Rick Martin - Unassigned firefighter

Observing the Fire from Canyon Rim

Herb Cummings - District Resource Forester

A total of 24 people had been delivered to the fire by helicopter when the accidents occurred. The available personnel were organized into four squads with two people managing the helicopter operations (Black and Dumas). The exact assignments for Noel and Campbell are unknown, however, both J. Martin and Purdy recognized Noel as their supervisor or crew boss.

B. Qualifications and Experience

The Forest Service has adopted the National Interagency Fire Qualification System. This is included in Forest Service Manual 5134.4. The specific training required before one is assigned to fire suppression duties plus the required step test scores are included.

Minimum training requirements before being assigned fire suppression duties are satisfactory completion of:

1. Introduction to Fire Behavior, S-190.
2. Basic Firefighter, S-130.

The required training had not been given to 18 of the 25 people involved. In addition, the step test had not been taken or satisfactorily completed by 3 of the 25 people assigned to fireline duty.

With respect to the inadequacy of training, several people stated that due to the amount of functional work to be done, there was insufficient time to meet preparedness requirements.

A summary showing overhead and firefighter training, step test qualification, Red Card rating, plus fire assignment are shown on the following pages.

Name	Fire Assignment	Fire Training and Year Received			Passed Step Test	Red Carded	Highest Red Card Qualification
		S-130	S-190	Other			
Rick Martin	Firefighter	No	No	4-hour miscellaneous fire training 7/15/77.	Yes	No	-
Barry Sheakley	Squad Boss	Yes	Yes	5-110(1963) 5-211(1968) S-212(1968) S-215(1969) S-230(1969) 5-260(1976)	Yes	Yes	Sector Boss
Ray Ruble	Firefighter	No	No	4-hour miscellaneous fire training 7/15/77.	Yes	No	-
Patrick Crevelt	Firefighter	No	No	40-hour fire training by California Dept. Forestry.	Yes	No	-
Dave Simpson	Firefighter	No	No	4-hour miscellaneous training 7/15/77.	Yes	No	-
Geary Searfoss	Firefighter	No	No	4-hour miscellaneous fire training 7/15/77.	Yes	No	-
Don Black	Helitack Foreman	Yes	Yes	S-110(1973) 5-211(1974) S-212(1975) 5-214(1975) S-230(1975) S-260(1976) S-270(1976) 5-352(1977)	Yes	Yes	Air Service Mgr. Crew Boss
John Uphoff	Firefighter	No	No	1-day District Fire School 1976. 4-hour misscellaneous training 7/15/77.	Yes	No	-
Yolanda Jenkins	Firefighter	No	No	4-hour miscellaneous training 7/15/77.	Yes	No	-

Name	Fire Assignment	S-130	:Fire S-190	Other	Passed Step Test	Red Carded	Highest Red Card Qualification
Karen Coleman	Firefighter	No	No	2-day ground tanker training - BIM 1976. 4-hour miscellaneous fire training 7/15/77.	Yes	No	-
Dennis Hatch	Fire Boss Squad Boss	Yes 1965	Yes 1966	S-110(1965) S-211(1967) 5-212(1968) S-215(1969) 5-230(1971) 5-260(1976)	Yes	No	Sector Boss
Chuck Miner	Firefighter	No	No	16-hour helitack training 1976.	Yes	No	-
Rich Harned	Firefighter	No	No	8-hour District fire school 1976. Helitack training 1976. 4-hour miscellaneous fire training 7/15/77.	Yes	No	-
Tom Plasky	Firefighter	No	No	8-hour District fire school 1976. 4-hour miscellaneous fire training 7/15/77.	Yes	No	-
Dave Strantz	Firefighter	No	No	4-hour miscellaneous fire training 7/15/77.	No	No	-
J. Martin	Squad Boss	No	No	38-hour classroom training N.C. State Univ. may be equivalent to S-130 & 5- Had structure fire training State of Pennsylvania	Yes	No	-

T

Name	Fire Assignment	Fire Training and Year Received			Passe Step Test	Red Carded	Highest Red Card Qualification
		S-130	S-190	Other			
Dave Dumas	Assistant Helitack Foreman	Yes 1975	Yes 1975	Lincoln N.F. 1-week fire School plus scheduled daily training 1975. 8-hour District fire school Ashley, N.F.	Yes	No	-
Ray Purdy	Squad Boss	Yes 1976	Yes 1976	R-6 District fire school 1976. R-6 IR Crew Member 1976.	Yes	No	-
Carol Jackson	Firefighter	No	No	4-hour miscellaneous fire training 7/15/77.	No	No	-
Annette Rogers	Firefighter	No	No	4-hour miscellaneous fire training 7/15/77.	Yes	No	-
Darrell Parks	Firefighter	No	No	4-hour miscellaneous fire training 7/15/77.	Yes	No	-
Val Norman	Firefighter	No	No	8-hour R-1 District fire school 1976.	Yes	No	-
Gene Campbell	Unknown	Yes 1963	Yes 1963	S-211(1965) S-212(1965)	No	Yes	Squad Boss
Dave Noel	Unknown	Yes 1959	Yes 1960	S-110(1958) S-211(1960) S-212(1960) S-214(1971) S-215(1966) S-230(1971) S-260(1975) S-320(1969) S-330(1973) S-390(1974)	Yes	Yes	Sector Boss
Dwight Hodgkinson	Firefighter	No	No	4-hour miscellaneous fire training 7/15/77.	Yes	No	-

C. Logistical Support

The logistical support was very good. All personnel on the fire were equipped with fire shirts, hard hats, handtools, and water. Fire resistant pants and fire shelters were not provided. Due to the rapid intensification and spread of the fire and the close proximity of all personnel to the fire, it would not have been possible to take the fire shelter out of the carrying case, open it up, and get inside of it before the fire would have overrun anyone trying to use a shelter.

A small cache of tools and water had been established near helispot 2. Hatch, Dumas, and Noel were equipped with portable radios. The distance between the four squads was such that voice communication could be maintained between Hatch's and Sheakley's squads and between Martin's and Hatch's squads. Purdy's squad, had it started work, would have been in voice communication with J. Martin's squad.

D. Aviation Management

Aviation management was handled very well.

Up to the time of the accident, there had been one airtanker drop. While in the area, the tanker pilot was in radio communication with Hatch.

The helicopter operations were handled in a very professional manner. A flight invoice was prepared for each trip. Foreman Black remained at the Cedar Springs Lagoon heliport to prepare the manifests and load people and/or cargo. Assistant Foreman Dumas was at the helispot on the fire where the helicopter was landing. He was assisting people off the helicopter.

E. Compliance with Ten Standard Orders

The following Ten Standard Orders were violated:

1. Keep informed on fire weather conditions and forecasts.

0930 forecast from Salt Lake City specifically called

for winds to be mostly controlled by topography with considerable gustiness in late afternoon. If this forecast was known, it was not heeded.

2. Know what your fire is doing at all times--observe personally, use scouts.

The majority of the fire could be seen by the responsible overhead. However, they were so involved in building fireline that they did not perform the full responsibilities of an overhead position, including knowing what the fire was doing at all times.

3. Base all actions on current and expected behavior of fire.

The fire overhead should have recognized that a down-slope wind was unusual for this area in the afternoon. If this had been recognized, they might have anticipated the shift to a normal upslope influence. All overhead were involved in line construction. This did not permit them to take the time to properly observe and evaluate the fire behavior and what could be expected.

4. Have escape routes for everyone and make them known.

All personnel had apparently been told to "get into the burn" in event the fire flared up. However, there was no planned escape route. It was a situation where each person ran from where they were to get into the burn. If the fire had intensified 15 to 30 seconds earlier, there probably would have been additional fatalities.

5. Post a lookout when there is possible danger.

There was no person specifically designated as a "lookout" for the crew.

10. Fight fire aggressively but provide for safety first.

VI. INVESTIGATION

Regional Activity

July 16, 1977

1700 MDT

Don Black notified John Robotcek (Forest Timber Management and Fire Staff) of the fatalities and positively identified the three victims.

1715

Robotcek called District and said he would take care of the "law enforcement" part of the fatalities.

Dale Thompson (RO Dispatcher) notified Claude Elton (DRF-Administration) of the fatalities, but names were not disclosed.

1750

Elton, using FSM 6700 procedure, notified Chet Shields (Associate Deputy Chief-Administration).

1800

Elton notified Regional Forester of accident and resulting fatalities. A Regional investigating team was appointed consisting of Elton, Chief Investigator; Dean Lloyd, Director of Fire and Aviation Management; and Richard Leicht, Director of Cooperative Forestry and Fire.

1920

Regional investigating team left for Vernal, Utah, Supervisor's Office.

2040

Regional investigating team arrived at Supervisor's Office and met with Robotcek and R. Chandler (S.O. Fire Dispatcher). Regional investigating team was given names of the victims and they were unable to

identify any action taken by S.O. or District on investigating the accident.

2245

Regional investigating team met with Robert Rowen (Forest Supervisor) who had just returned from the fire scene. The team was briefed by the Forest Supervisor and informed that the sheriff's office was removing the bodies of the victims.

July 17, 1977

Regional investigating team and District personnel went to Dutch John (Flaming Gorge District Office) to interview witnesses and also photograph the accident site.

WO Activity

July 16, 1977

1750 MDT

Chester Shields notified by Elton of accident. A brief summary of the accident was related, but no names were disclosed.

1900

Frank Ribeiro notified of accident by Shields and assembling of investigating team assigned to him as required by FSM 6700.

2010

Raymond Housley (Associate Deputy Chief-NFS) was notified by Ribeiro because Thomas C. Nelson (Deputy Chief-NFS) was unable to be reached. Housley agreed to a national investigation of the accident.

2012

Ribeiro attempted to reach both John Barber (Associate Deputy Chief-S&PF) and F. LeRoy Bond (Associate

Deputy Chief-NFS) to head up the investigation, but was unsuccessful.

2015

Ribeiro notified Henry DeBruin (Director of Aviation and Fire Management) of the accident and was asked for recommendations for technical specialists.

2020

Barber, reached by Ribeiro, agreed to be chief investigator. Lynn Biddison (Director of Fire and Aviation Management, R-3) was selected as technical specialist for the investigating team.

2030

Biddison was reached by Ribeiro and he agreed to join the investigating team.

2045

Ribeiro notified Barber of Biddison's agreement to join the investigating team and Craig Chandler (Director of FFASR) was selected as the WO Director Representative on the team. As Chandler and the alternate were unable to be reached, it was decided to wait until Monday, July 18 to notify him.

Members of the WO investigating team, excluding Chandler, arrived in Salt Lake City on the evening of July 17. The team left the next morning for the Ashley Supervisor's Office, arriving in Vernal, Utah, at 0920. The WO investigating team met with the Forest Supervisor and the Regional investigating team for a briefing. At that time Elton and Leicht were appointed to the national investigating team. The team then notified the WO (Paul Madden) of current details on the accident and he was asked to update the Regional Forester. The team then left by automobile for Dutch John.

The investigating team met with John Combs (District Ranger) and was update on the situation. The team then left by helicopter for the accident site and was later joined by Chandler at the site. The investigating team spent from 7/18 thru 7/20 gathering data for the investigation and on 7/21 developed the outline for the brief and report prior to returning to their respective units on 7/22.

The investigation consisted of initially obtaining information from the Regional investigating team. All personnel on the fire at the time of the accident were interviewed and written statements requested of them. Other personnel related to the accident were also interviewed and all related documents were requested by the team from the District, Forest, and Regional levels. Three trips to the accident site were made by the investigating team.

VII. FINDINGS

The investigating team reviewed all of the information which had been provided them by the various Forest Service offices and by individual witnesses during interviews and in written statements. Nineteen findings were documented. These findings are not necessarily directly related to any causal factor. They do reflect the situation on July 16 as it relates to preparedness, training, and response of personnel on the Flaming Gorge District. Each of these findings relates directly to information contained in this report. The findings are grouped by the general category of Management Concerns, Personnel, Logistics, Weather, and Fire Environment. They are:

Management

1. Fire Boss acted as Squad Boss.
2. Three squads were working three unanchored lines.
3. Majority of fire personnel did not meet training requirements of FSM 5134.4 and 5131.41c.
4. Management emphasis on functional assignments precluded adequate, timely fire training.
5. National Red Card Policy was not enforced.
6. Helicopter management and operations were well executed.
7. All squads were briefed on job assignments and action to take if fire flared up.
8. High motivation and esprit de corps were exhibited by District personnel.

Personnel

9. Few firefighters and not all overhead met qualifications for fire assignments.

10. Firefighters exhibited excellent response to directions in the emergency situation.
11. Approximately a minute before his death, and at his request, Dwight Hodgkinson traded places with Yolanda Jenkins, placing himself last in line of escape.
12. Ten Standard Firefighting Orders 1, 2 3, 4, 5, and 10 were violated.

Logistics

13. Logistics were well handled.
14. All firefighters wore hard hats and fire resistant shirts, none carried fire shelters.
15. Elapsed time was too short for fire shelters to have been used.

Weather

16. Weather was normal for the season and location except for wind direction.

Fire Environment

17. Overreliance on persistence of unusual downslope wind.
18. Failure to recognize potential intensity and rate of spread of fire in flash fuels, even on gentle to moderate slopes.
19. Fire behavior was unusual, but not abnormal.

APPENDIX A

FIRE WEATHER FORECASTS

AND

FIRE DANGER OBSERVATIONS

NATIONAL WEATHER SERVICE
SATURDAY JULY 16, 1977

SALT LAKE CITY UTAH
0930MDT

MORNING FIRE WEATHER FORECAST

DISCUSSION .. LARGE SUBTROPICAL HIGH WITH CENTER OVER 4-CORNERS AREA W UTAHS WEATHER THROUGH MONDAY. FLOW OF MOIST UNSTABLE AIR INTO THE STATE TO PRODUCE THUNDERSTORMS BUT NO LARGE SCALE ACTIVITY EVIDENT YET.

FORECAST

TODAY

WEATHER PARTLY CLOUDY TO CLOUDY WITH SCATTERED SHOWERS AND THUNDER-SHOWERS THIS AFTERNOON AND EVENING.

TEMP CONTINUED HOT. MAXIMUM TEMPERATURES AT 5500 FEET 90 TO 95 AND AT 7500 FEET 80 TO 85 DEGREES.

RH HIGHER. MINIMUM HUMIDITIES AT ALL LEVELS 15 TO 20 PERCENT WESTERN DESERT AND LOCALLY ALONG THE WASATCH FRONT AND 20 TO 25 PERCENT ELSEWHERE.

WIND ... LIGHT AND VARIABLE AT ALL LEVELS-MOSTLY CONTROLLED BY TOP-OGRAPHY. CONSIDERABLE GUSTINESS IN THE LATE AFTERNOON AND NEAR SHOWERS AND THUNDERSHOWERS.

TONIGHT PARTLY CLOUDY WITH WIDELY SCATTERED SHOWER ACTIVITY. CONTINUED WARM WITH HIGH HUMIDITIES AND GENERALLY LIGHT WINDS.

SUNDAY

WEATHER PARTLY CLOUDY TO CLOUDY WITH INCREASING SHOWERS AND THUNDER-SHOWERS.

TEMP LITTLE CHANGE. MAXIMUM TEMPERATURES AT 5500 FEET NEAR 90 AND AT 7500 FEET NEAR 80.

RH LITTLE CHANGE. MINIMUM HUMIDITIES AT ALL LEVELS 20 TO 25 PERCENT.

WIND ... LIGHT AND VARIABLE AT ALL LEVELS BUT CONSIDERABLE GUSTINESS
NEAR SHOWERS AND THUNDERSHOWERS.

EXTENDED FIRE WEATHER FORECAST FOR MONDAY TUESDAY AND WEDNESDAY.
SHOWERS AND THUNDERSHOWERS DECREASING TUESDAY AND WEDNESDAY.
CONTINUED
HOT BUT WITH A COOLING TREND ON WEDNESDAY. LOWER HUMIDITIES.
GENERALLY
LIGHT WINDS BUT INCREASING TUESDAY AND WEDNESDAY.

END RJH

ZCZC
RWUS RWRE 162115
-SLC

ZZZZ

BULLETIN
FLASH FLOOD WATCH
NATIONAL WEATHER SERVICE SALT LAKE CITY UT
315 PM MDT SAT JULY 16 1977

THE NATIONAL WEATHER SERVICE HAS ISSUED A FLASH FLOOD
WATCH THROUGH THIS EVENING ...8PM...FOR SOUTHWESTERN UTAH.

A FLASH FLOOD WATCH MEANS FLASH FLOODING IS POSSIBLE WITHIN
THE WATCH AREA. PERSONS IN THE WATCH AREA ARE ADVISED
TO CHECK PREPAREDNESS REQUIREMENTS... KEEP INFORMED AND
BE READY FOR QUICK ACTION IF FLASH FLOOD IS OBSERVED OR
A WARNING IS ISSUED.

RADAR REPORTS AUGMENTED WITH SATELLITE DATA INDICATES
STRONG THUNDERSHOWERS CELLS IN SOUTHWESTERN UTAH SOUTHWARD
INTO NORTHWESTERN ARIZONA. RAIN HAS BEEN FALLING FOR THE
PAST HOUR AT THE CEDAR CITY RADAR SITE ON BOULDER MOUNTAIN.

ADDITIONAL STATEMENTS WILL BE ISSUED AS REQUIRED.

NATIONAL WEATHER SERVICE
SATURDAY JULY 16, 1977

SALT LAKE CITY UTAH
1530 MDT

AFTERNOON FIRE WEATHER FORECAST

DISCUSSION ... SUBTROPICAL HIGH STILL DOMINATES UTAH BUT RELATIVELY STRONG DRY WESTERLY FLOW APPEARS TO BE SINKING SOUTHWARD INTO THE NORTH PART OF THE STATE AND WILL PROBABLY INHIBIT ANY FURTHER ADVANCE OF MOISTURE NORTHWARD. ALSO POSES A THREAT OF INCREASING SOUTHWESTERLY WINDS IN NORTHWESTERN UTAH WITH POSSIBLE RED FLAG CONDITIONS DEVELOPING LATER IN THE WEEK END.

FORECAST

TONIGHT.... THUNDERSHOWER ACTIVITY CONTINUING IN EAST AND SOUTH PORTIONS OF THE STATE WITH CHANCE OF LOCALLY HEAVY RAIN SOUTHWEST UTAH. SLIGHT CHANCE OF A FEW ISOLATED THUNDERSHOWERS NORTHEAST PORTION. CONTINUED WARM WITH HIGH HUMIDITIES. WINDS FROM THE SOUTHWEST OR WEST 8 TO 12 MPH IN NORTHWESTERN VALLEYS OTHERWISE LIGHT TO MODERATE DOWNSLOPE. WINDS OVER THE RIDGES SOUTHWEST TO WEST 10 TO 15 MPH.

SUNDAY

WEATHER.... PARTLY CLOUDY TO CLOUDY WITH SHOWERS AND THUNDERSHOWERS SOUTH AND EAST PORTIONS AND CHANCE OF SCATTERED SHOWERS NORTHWEST.

TEMP... GENERALLY LITTLE CHANGE BUT SOMEWHAT COOLER IN SHOWER AREAS. MAXIMUM TEMPERATURES AT 5500 FEET NEAR 90 AND AT 7500 FEET NEAR 80.

RH..... A LITTLE HIGHER EXCEPT SLIGHTLY LOWER NORTHWEST. MINIMUM HUMIDITIES NEAR 15 PERCENT NORTHWEST. AND 20 TO 25 PERCENT ELSEWHERE.

WIND... INCREASING. GENERAL WIND SOUTHWEST 12 TO 18 MPH WESTERN VALLEY CONSIDERABLE GUSTINESS DURING THE AFTERNOON AND NEAR SHOWERS AND THUNDERSHOWERS.

OUTLOOK FOR MONDAY.....SHOWER ACTIVITY CONTINUING IN THE SOUTH AND SOUTHEAST PORTIONS OF THE STATE BUT THREAT ENDING IN THE NORTH. A LITTLE COOLER. LOWER HUMIDITIES NORTH BUT LITTLE CHANGE SOUTH. DECREASING WINDS.

END RJH

ACTUAL INDEXES FOR

-07/16/77-

STATION	MS	DY	HR	LR	MR	IC	SC	EC	OI	BI	FLI	MC	AC
CARD	C2	16	14	13	50	39	08	23	25	13	16	3#	MD
BUSCYN	D3	16	14	13	50	73	07	25	47	23	34	5	EX
SOAPST	C2	16	14	23	50	18	01	47	13	12	14	3#	MD
BARRVR	G2	16	14		MISSING								
DTCHJN	H2	16	14	25	20	35	01	17	16	06	07	3-	MD
LUCERN	C2	16	14	23	20	40	17	22	18	17	20	3#	MD
DUGWAY	A1	16	14	13	35	91	11	17	45	04	06	5	EX
GRDSMN	D3	16	14	10	35	62	05	24	29	18	23	3#	HI
REDBTE	D3	MISSING											
PLSGRV	D3	16	14	13	38	80	08	25	42	23	33	3#	HI
MIDWAY	D2	16	14	20	35	46	04	22	26	15	19	3#	HI
YLWSTN	C2	16	14	25	20	34	06	22	16	10	12	3-	MD
FTDSHN	C1	6	14	25	25	80	02	27	41	06	08	2	MD
DNOQRY	C1	MISSING											
CHLKCR	C2	QY	14		MISSING								
FISHLK	D2	16	14	20	35	13	04	15	07	13	14	3-	MD
RCHFLD	C2	MISSING											
KANAB	C2	MISSING											

END

BASIC WEATHER OBSERVATION

DUTCH JOHN AIRPORT

OBSERVATION TIME 1330 7/16/77

State of Weather	3
Dry Bulb	78
Wet Bulb	58
Dewpoint	46
Rel. Humidity	33
Herb. Veg. Condition	-6
Lightning	3
Man-Caused	20
Wind Direction	3SE
Wind Speed	6
Fuel Moisture Stick	9
Maximum Temp.	91
Minimum Temp.	66
Max. R.H.	48
Min. R.H.	22

? yes *all*

At about 1400 the tanker arrived and made several retardant drops on heavy fuels along the ridge northwest of Sheakley's line, and on the fire along the edge of Cart Creek canyon west of Hatch's position. Additional personnel had joined the two squads making a total of 10 persons. After some shifting of personnel, Hatch and Sheakley each had four firefighters in their squads. Dwight Hodgkinson was on the ridge with Sheakley.

As additional personnel arrived at Cedar Springs they were organized into squads by Dave Noel and transported to a second helispot east of the initial spot. By about 1430, eight more persons were on the lower site and a four-man squad under J. Martin was sent part way up a small ridge east of the original point of attack to begin building line uphill along the edge of the fire which had crept east below the initial attack point and was moving uphill. Noel had radio contact with Hatch and selected the starting point. A second squad was to begin building line downhill. Noel returned to the helispot and instructed this six-person squad that had finished arriving while he was starting J. Martin's squad. The new squad led by Ray Purdy proceeded from the helispot toward where they were to begin building line. Gene Campbell had arrived with the last squad members at a new helispot farther to the east (No. 3). He and Noel were following a few yards behind Purdy's squad. The helicopter returned to helispot No. 3, dropped one person, and after several minutes was airborne; time was estimated at 1455.

North east

Within the next minute, the fire along the entire east side shifted abruptly, became a head fire and "rolled" toward the southeast. At the top of the ridge Sheakley's squad at first dropped back to the east above Hatch's line, then, realizing the fire intensity ^{and direction} *shift*, began running to the east along the rocky bluff to reach a place to get down the 10-20 foot drop. They came down in an orderly fashion, dropped their tools and ran into an opening and through Hatch's line into the burned area. Hodgkinson was last in line. He came down the rocky bluff with the others, but at some point later turned around and ran back toward the point of descent. The helicopter was then above him and the pilot and helitack foreman on board tried to get his attention to direct him to follow the route of the other firefighters, but were unsuccessful. Immediately before the fire overran him, Hodgkinson appeared to be disoriented.

When the fire intensified both Hatch's and J. Martin's squads moved across their lines into the safety of the burned area. Purdy had reached a point below the end of Martin's line but had not started work. Purdy and others yelled for everyone to run ahead into the burned out area. Most of the squad had been walking in file and all successfully escaped into the burned out area.

3?

Campbell and Noel apparently were cut off from the same escape route. They ran ahead of the fire up a low rocky ridge to the southeast, then turned north toward the helispot, but fell before reaching it. The fire, intensely hot, passed over them in a few seconds. Eyewitnesses near helispot No. 2 said Campbell tried to pour water over himself, Noel did not move after falling. The incident along the entire length of the fire front is described in terms of seconds.

The two persons who had moved up from Helispot No. 3 to No. 2 and witnessed the deaths of Campbell and Noel then realized they were in danger and ran north toward Spruce Creek. Just as they were starting down the canyon slope the helicopter pilot saw them, made a landing a few yards ahead of the fire and picked them up.

There were no injuries or burns to any of the other firefighters. The fire was about 50 acres when it intensified and made its run. The next available map, an IR Scan at 0130 on July 17 showed 940 acres within the perimeter. The Cart Creek fire was controlled at 1800, July 18 at 1480 acres.

A map prepared by aerial recon 2000 7/16

After accident, District people stopped fighting fire. Hal C. took over fire. ordered D/H Team 5, 10 crews
We proceeded with evaluation of losses.

Accident as defined by Natl. Investigation Team

Have not seen final investigation report.

Needless to say - has raised many Qs. on District re training, whether or not fire dept, etc.

Step Test
Training
Anchor Line
Anticipate wind shift
Lookout

Drought cause?

Memorial

