DONNELLY FLATS FIRE INCIDENT
Fort Greely, Alaska
1999

INTRODUCTION

On June 11, 1999, a wildland fire near Donnelly Dome was reported to Delta Area Forestry. This area is predominantly black spruce and is located just north of the Alaska range on U.S. Army Ft. Greely administered lands. It is an area that is influenced by topographical and glacially induced winds. Local weather was clear 76 degrees, variable winds at 10 mph, with a relative humidity of 19 and the fuels were very dry.

Several types of initial attack forces were dispatched to the fire including engines, Helitack, Smokejumpers, Type 1 and 2 crews, dozers, and retardant aircraft. These forces were deployed and began a flanking action starting at a good anchor spot and working south along both flanks. In the early afternoon the wind began to become variable and shift from a north to east to west and finally to a steady southerly direction. Personnel were expecting this and believed they had good safety zones and escape routes if needed. They felt confident in their actions and were making good progress in spite of concerns for exploding ordinance which they were encountering along the way.

The incident in question began at approximately 1600-1615 when the fire was just beginning to come under the effect of a southerly wind but not moving quickly. It was reported that one or possibly two vortices (whirlwinds) developed at what was now the head of the fire. The wind change coupled with these vortices began to create erratic burning conditions that necessitated the preventative withdrawal of forces off the line.

The forces on the eastern flank, consisting of eight Smokejumpers and 16 person Delta EFF crew members, had already made the decision to pull off the fire due to increasing activity when the whirlwind began to form within the Ablack≅ portion of the fire. It quickly increased in size and all the firefighters ran for the safe zone. Eyewitnesses say the funnel quickly built to a diameter of 50-100 ft. at the base and had very strong winds that picked up trees, debris, and a Shindaiwa pump which was still attached to its cargo chute. Everyone gained the safety zone and observed the funnel re-igniting material in the already burned area as well as spread fire to unburned fuel.

The forces on the west flank consisted of seven Smokejumpers who were working the fire using direct attack and reinforcing a dozer line by burning out unburned material. They separated into two groups. One group was looking for spot fires in an unburned area and the other worked on improving the line. It was at this time that a strange sound was heard, Asort of whoofing≅. The sound was first thought to be some kind of ammunition or possibly some fuel venting; but as the fire activity increased, the decision was made to pull off the line. Visibility was poor due to vegetation and as the Smokejumpers began to run down the line, they saw a whirlwind come out of the black picking up embers and re-igniting

burned and unburned material. This whirlwind cut between the two groups and forced them to take refuge in the Ablack≅ safety zone. One smokejumper was overtaken by the whirlwind and received first and second degree burns. He received medical attention and no permanent damage was sustained.

INCIDENT (all times are approximate)

0950 A wildland fire was reported to Delta Area Forestry (DOF). Mike Bobo and Reb Ferguson were dispatched with their engines. After determining it was not the pump station, Bobo (IC) ordered retardant, air attack, and Helitack. The area ordered smokejumpers.

Upon arrival, the fire was approximately 5 acres. As helitack arrived, they set up a porta tank and began to work on the right or west flank of the fire.

1100 Two loads of Smokejumpers arrived at the fire and were deployed on to the line. Load #1 consisting of Mitman, Brown, Ortega, Cramer, Dibert, Veitch, Hardy, and Wattenbarger went to the right (west) flank and load #2 Nelson, Meierotto, Liston, Yeager, Taylor, Carroll, and Adell went to the left (east) flank.

The plan was to do a flanking action along both sides of the fire tying in the east flank to Jarvis creek and the west flank to dozer lines, roads and an old airstrip. Several loads of retardant were dropped.

1200 The IC was concerned that the wind would change to a SW wind and threaten the east flank and make a run at Ft. Greely. He ordered more retardant to strengthen the line and cool the fire. The Delta crew arrived and was deployed along the east flank with Bruce Nelson working a hose lay and improving the line in preparation for burning out. Bert Mitman, Bruce Nelson, and the Crew boss for the Delta crew fly the fire for reconnaissance.

1300 Military FMO flies over the fire and after talking to Air Attack, decided against the IC=s request for more retardant feeling that it was ineffective. The FMO decided on plan AB≅ to strengthen the southern end of the fire with another load of smokejumpers and the type 1 crews and contain that side of the fire.

1400 A third smokejumper load lands on the southern end of fire and are joined by the type 1 crews. The forces on both flanks were progressing well with saw lines, dozer support, and hose lays.

1500 The east flank is being worked on by Bruce Nelson (load #2) and the Delta crew. The plan was to connect the line to a drainage paralleling Jarvis Creek and then burn out any unburned fuel using a hose lay for support. Direct attack operations were

abandoned due to large numbers of munitions going off in the area.

The west flank was putting in saw line and was then supported by a dozer line from which they were burning out to clean away any unburned material. The smokejumpers were gridding the area and searching for spots across the line.

Both flanks were hearing many rounds of ordnance going off within the fire area. Most stated that it was small arms; but some personnel thought they heard larger explosions as well.

1545 (East Flank)

Burn out operations had begun at the end of the hose lay when the wind suddenly changed from the north to the south and began to increase in speed. Fire activity began to increase and Yeager advised Nelson that the area was going to get too hot and that they were pulling out. The decision was made to regroup back closer to the road and much of the east flank was abandoned.

(West Flank)

The smokejumpers split into two groups with Vietch and Hardy continuing to search for spot fires while the rest went back down the line to Cramer and began to improve the line.

1600 (East Flank)

The fire intensity begins to increase but with all personnel located close to the safety zone, Nelson is not overly concerned and plans are made to begin to rescue some of the hose by pulling it off the line.

(West Flank)

Fire intensity begins to pick up. Veitch and Hardy begin to take stock of their position and discuss their actions should they need to move.

Cramer, Ortega, Dibert, and Wattenbarger worked together improving the line. Brown went back down the line and worked with state personnel on the hose lay.

Air Attack notifies the IC that the wind has shifted around the compass and is now coming out of the south. He in turn is informed that a tornado is hitting the ground at the north side of the fire. The airplane turns toward the north and Air Attack McKnight notices two distinct eddies on the East and West side of the column which last approximately 5 minutes.

1610 (East Flank)

As the Smokejumpers were trying to retrieve hose, Taylor reported seeing a whirlwind forming within the black of the fire. It quickly built in size and he notified Nelson of the increased activity. They agreed to pull back off the line. Meierotto heard the call to pull back and urged the Delta crewboss to get his crew moving faster toward the safety zone. The whirlwind grew to a diameter of 100 ft. at the base and began to pick up dust, ash, and embers. As it grew in strength it began picking up vegetation. Trees up to 20 ft. long were uprooted and reported seen moving in the funnel, a pump still attached to the parachute was sucked up, as well as, a fire shelter still within its case which the Delta crewboss had taken out of his pack. The winds were strong enough to draw things toward the funnel and impeded the ability of fire fighters to run away from it. The statement was made by Taylor that "the wind felt as if it might lift me off the ground". All firefighters managed to get to the safety zone without injury while the whirlwind blew across the fireline and spread fire throughout.

1610 (West Flank)

The fire intensity increases and visibility becomes a problem due to smoke. Veitch and Hardy notice that the fire is now burning on the wrong side of the line and they discuss which way to go. They decide that trying to get to a meadow through unburned fuel was not wise and opted for waiting in the dozer line adjacent to an already burned section of the fire giving them an added safety zone of the black. At the same time, they noticed a strange sound. It was first thought to be some kind of munitions since a large number of small rounds were popping off; but it had a strange loud whoofing sound they had not heard before. Veitch was concerned enough to call Cramer and discuss it with him. The smoke became too dense for them to see what was making the noise but they heard it pass and then saw that the fire had crossed the road. With fire advancing on them from two sides, Vietch and Hardy moved into the black, which was a good clean burn, the ground was still somewhat hot but was not an apparent threat. They moved in approximately 100 ft. and then decided to return for the chainsaw they had left in the fireline. After retrieving the saw they moved again into the black in an effort to regroup with the other smokejumpers.

(West Flank)

Cramer received the call from Veitch. Talking it over with Ortega, Dibert, and Wattenbarger, he made the decision that due to the lack of visibility and increased fire behavior, he did not care what the sound was it was time to Aget the hell out of there≅. They began to move down the fireline with Cramer directing Ortega to lead

and avoid any unburned material encountered in the black. The order was Ortega followed by Dibert, then Cramer with Wattenbarger bringing up the rear. After running approximately 75 yards, Wattenbarger looks back and sees what appears to be a large fire whirl following them down the line. At the same time, Ortega took a 90-degree turn and began to lead them into the black safety zone. The black spruce had been burned very well with only the trunks standing allowing the smokejumpers to make quick, good progress. Wattenbarger looked back again and realized` that the fire whirl was still on the same course as the jumpers and they began to make direction changes but the whirl still seemed to follow them. As it gained ground, the fire whirl began to Asuck≅ air from in front of the smokejumpers and the wind increased picking up ash and debris and cutting visibility to only a few feet. As Wattenbarger followed, he got hung up on a small spruce tree; he dropped his beater, and tried to continue. Before he could get around the tree, he lost sight of his companions and the wind increased to the point where he thought he was going to get picked up so he grabbed for the nearest tree. Before reaching the trunk it ignited and began glowing orange, as did everything he could see around him including the ground. The wind at this point did not seem as strong and visibility improved to about 20 feet. Debris was swirling around but not much smoke. His immediate thought was that he could not breathe what was potentially super heated air and that he could not drop to the ground because it was glowing. He made the decision to run out of the whirl that had overtaken him. Covering his head with his gloved hands, he ran 90 degrees from his original direction and after 30-40 feet, he was clear of the burning area. Wattenbarger then contacted Cramer and found they were uninjured. Wattenbarger began to cool down areas where he could feel he was burned by using water from the dozer line and walked to where they had taken refuge within the already burned area.

The entire evacuation and whirlwind incident happened extremely quick, between 2 to 3 minutes in length giving little time for reaction.

Veitch and Hardy soon joined Cramer, Wattenbarger, Dibert, and Ortega. Realizing that the black was not really safe from any further whirlwinds the decision was made to move to a nearby wet meadow and wait the fire out.

They arrived at the meadow and remained in the safe zone for approximately 3 hours.

The IC was notified of the incident and transportation was arranged for Wattenberger to receive medical attention. The extent of his injuries included 1st degree burns to his face, 2nd degree burns to the tips of his ears, tip of the nose, chin, and a spot on his cheeks, and on his right elbow. He has recovered totally with little apparent permanent damage.

FINDINGS

1. **Firefighters exhibited good decision making and planning with appropriate attention given to the Ten Fire Orders.**

Most of the firefighters on this fire were very knowledgeable with many years and seasons of fireline experience. It was this experience and ability to recognize a changing and dangerous situation that allowed them to react decisively in order to avert a potentially catastrophic incident.

-Escape routes and safety zones had been discussed and planned out.
-Personnel had been briefed on expected wind changes and on the dry volatile condition of the fuels
-Attentiveness to changing situations, ability to interpret a threat and decisive action prevented more injuries.
-Firefighters showed mental controls and poise in a stressful situation

2. Live ordnance found on military reservations causes concern and some confusion on appropriate actions for firefighters. The policy for dealing with ordnance must be clarified.

The large amount of live ordnance exploding in the fire area caused firefighters to modify their tactics and may also have slowed down their decision making when confronted with an unknown sound. Time was taken up discussing what the Asound≅ may have been possibly slowing down the decision to evacuate the area. There is still confusion on what the policy is for dealing with live ordnance.

3. Fire shelters were not used in this incident.

Firefighter statements indicated that fire shelters were not used. In their opinion use of fire shelters would probably have been impossible if not detrimental. The speed and violence of the whirlwind would have precluded the deployment of a fire shelter. In addition as the whirlwind passed, it re-ignited already burned material much like a bellows giving no appropriate place to deploy.

4. Fire shelters were not being worn by a significant number of firefighters.

Several smokejumpers interviewed stated that they were not wearing their fire shelters on the line. Their reasoning is partly scientific concern and partly philosophical in nature based on the belief that fire shelters are not suited for, nor tested in, Alaskan conditions and fuel types. The long history of only one precautionary shelter deployment in Alaska coupled with many arguments about the weight debt on the individual from carrying it, the lack of mineral soil for deployment, and the availability of Athe black≅ for a safety zone are used to question the fire shelters appropriateness to the Alaskan situation.

5.The whirlwind anomaly was an extreme event that is very unpredictable; but must be

addressed as a potential hazard when fighting fires in the Delta area.

Seasoned firefighters stated that after many years of fire experience, they had never seen fire behavior escalate to a life threatening situation so quickly. The extreme localized winds of the whirl degraded the effectiveness of the Ablack≅ as a safety zone in the vicinity of the whirl itself and made it imperative to move away from it. The Delta area is well known for erratic wind conditions which must be accounted for at all times.

CONCLUSION

1. Fire fighters should be commended for their attention to the Ten Fire Orders and the quick decisive action taken.

This potentially catastrophic event was minimized by the quick thinking and cool heads of the firefighters involved. The speed with which the whirlwind grew and its extreme effect on fire behavior surprised even the most experienced fire fighter. Its effect of re-igniting even already burned material within the black made everyone pause to think exactly how safe the black really is under such extreme conditions. The outcome of this incident was much less serious than it could have only because of their attention to tactics, discussion and planning for escape routes and safety zones prevented more serious injuries or possible fatalities. All the fire fighters involved especially J. Wattenbarger, B. Cramer, and J. Veitch should be commended for their cool, thoughtful, and decisive actions in reacting to this dangerous situation.

Action Item:
Supervisors should commend firefighters.

2. Expected fire behavior should continue to be reported on a daily basis.

Firefighters should receive a briefing on the potential for erratic wind behavior whenever they are dispatched to the Delta area. Use of spot weather forecasts with fire behavior input is recommended.

Action Item:
AICC to insure that daily weather, fuel volatility, and fire behavior information is transmitted to all firefighters

3. This incident should be studied and developed into a fireline safety refresher scenario.

Fire Behavior and fuels specialists should study this incident and determine if there is a method or series of events that could be used as indicators for predicting this kind of event in the future.

Action Item:
Operations Division to develop a Fireline Safety Refresher scenario to be presented FY 2000 fire season.

4.The unexploded ordnance policy needs to be clarified and re-emphasized with all firefighters.

There is confusion on:

a. How much, if any, ordnance is acceptable to work around.
b. What types of ordnance may be acceptable to work around.
c. What actions are to be taken around ordnance
d. Who has the authority to determine actions taken around ordnance.

Action Item:
The AFS management team will develop a seminar for fire suppression tactics to be used on Military lands. This seminar will look at issues such as suppression options, special emphasis sites and ordnance issues. Interagency participation by DOF, US Army, NFO, and any other appropriate agency will be solicited by invitation. The target date for this seminar is March 2000.

5. Fire shelters must be worn by all fireline personnel on wildland or prescribe fire operations.

National as well as Alaska Fire Service policy mandates that fire shelters will be worn by all fireline personnel. They are not intended to replace a good escape route or safety zone but to be used in a last ditch emergency effort as a survival tool or deflector shield.

If it is thought that they do not meet the needs of Alaskan firefighters then research should be funded and conducted to confirm the usefulness of fire shelters in Alaskan fuel types and an appropriate training program should be devised which outlines when, where, and how they can be used effectively.

In this particular situation, there is speculation that the speed and ferocity of the whirlwind would probably have prevented deployment of fire shelters and would most likely have exposed firefighters to more hazards. However, the decision to deploy a shelter is always up to the individual, but in order to have that option, the shelter must be worn and available.

Apart from the whirlwind area, there were many places on the fire such as dozer lines, roads, dirt, and gravel bars where a shelter could have been deployed if needed.

Action Item:
Fire Operations will spearhead the instructional development of alternative methods of use for fire shelters with emphasis on Alaskan fuel types. This may include a written proposal to MTDC for a national study to be conducted on deployment methods of fire shelters in deep duff and Boreal forest fuel types

Action Item:
Operations Branch Chiefs and FMOs will develop a plan to insure the use of required PPE and an appropriate method for monitoring that use. A target date of January 18, 2000 is set for a first draft submission to the management team for comment.

PPE to include:

Fire Shelter	Aramid fiber pants and shirts
8" leather boots	Hardhats (non metal w/ chin strap)
Hearing protection	Gloves (leather)
Eye protection	Any specialized PPE for specific work (Saw chaps ,etc.)