Powell Fire Whirl Lessons Learned Review

July 20, 2012

Meeker, CO

Powell Fire Dust Devil 7/20/12 osh Graham Photo 3

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Unit Jurisdiction
White River Field Office Meeker, CO

Background

On Thursday, July 19, 2012, smoke was reported in the West Jordan Gulch drainage 14 miles west of Meeker, Colorado. After initial attack the fire had grown to 250 acres. An ICT3 was ordered, and on July 20, at approximately 1212, a local ICT3 and ICT3 (t) took command of the fire.

The Northwest Colorado Fire Management Unit had been experiencing unseasonably warm and dry weather for the last several months with 163 fires reported thus far. On July 15th live fuel moistures were reported at 67%, down 88% from the previous year's sample, and 70% in the juniper, down 21%. Energy Release Components (ERC's) had been in the 90th percentile since late May, and were in the 97th percentile by early June. Crews had been briefed and had observed the very active fire behavior these conditions created.

Forecasts for July 20, 2012 were as follows:

GENERAL FORECAST	SPOT WEATHER FORECAST
PARTLY CLOUDY	PARTLY CLOUDY
MAXIMUM TEMPERATURE 82-92°F	MAXIMUM TEMPERATURE 87-91
MINIMUM HUMIDITY 13-23%	MINIMUM HUMIDITY 17-21%
WINDS SOUTHWEST 5-10 MPH	WINDS EAST 1-4 SHIFTING TO THE SOUTH
LAL 2	AND INCREASING 5-10 MPH
HAINES 5	HAINES 4
BI 83	
ERC 85	

On scene resources involved in incident:

ICT4, ICT4 (t), ICT3, ICT3 (t), E1613, E1614, Heavy Helitanker 716, and Air Attack.

Timeline

1200-1300:

After the transition in command from ICT4 to ICT3, the new IC ordered the following: operations, safety, two hand crews, and three engines. The plan was to utilize the new resources and release Engine 1613 and 1614 back to the district for initial attack. The ICT3 (t) asked the captain of 1614 and ICT3 to scout a line that would secure the south flank, the main egress route, and the safety zone. The two scouts used ATVs to perform this task as the fire continued to back down the drainage to the southeast. During this time the unpredicted North wind let up and the fire started to make periodic runs upslope. Several firefighters made note of the unpredicted North wind, as well as several dust devils on the main ridge to the west. Their observations were communicated over the radio. The two scouts concluded that the main ingress and egress road to the fire was the best location to conduct a burnout to contain the east flank. The road crossed over a mostly dry pond dam near an overgrazed area with short grass and sparse sage. This area was south of road and was designated as a safety zone. Both scouts agreed on the plan to burn out from an area void of vegetation 500 feet southeast of the dam to the main road. The ICT3 noted that the burnout operation would improve the safety zone as it was already sparsely vegetated but still unburnt.

1300-1320:

The ICT3 briefs E1613 and E1614 on the line prep and burnout operations. Air Attack and T-716 are both informed of the plan. Both engines proceeded to prepare a fire line approximately 300 feet long by 12 feet wide using a chainsaw to cut out brush and engine 1613 to support a progressive hoselay. The hoselay paralleled a fence that was east of the pond. Engine 1614 parked 30 feet south of the hoselay and perpendicular to the fence. Additionally, an ATV is parked adjacent to both engines and within the safety zone.

Crews finish prepping the line around 1310. The Captain and assistant from 1614 cross over a small, deep drainage to tie into the black and the end of the hose lay. With the wind now to their backs from the east they start the burnout operation. The burners were concerned their burn would not carry because of the lack of fine fuels in the overgrazed area. All resources were informed that the burn out operation had started. While standing on an overlook point in the black, the ICT3 (t) notices a large developing dust devil in the black moving eastward towards the burnout operation. This is relayed to the ICT3 standing next to the engines, and to the two personnel conducting the burnout operations. All resources acknowledge the transmission with an “affirmative” and the ICT3 asks the ICT3 (t) “to keep an eye on it”. Lighting operation is stopped before a lighter is committed to cross back over the deep drainage and at a place with a good vantage to watch progression of dust devil.

Powell Dust Devil 1310 hours 7/20/12 Josh Graham Photo 4

1320-1325:

The ICT3 (t) took several pictures of the dust devil moving downslope, and noted that it grew rapidly as it moved closer to the burnout operation. The dust devil works its way down a bench and then dropped into a drainage west of the burnout and grows in intensity as it picks up fire to become a fire whirl. Captain of 1614 told the assistant (the two people conducting the burn) that "we need to get out of here" and both turned and ran to the black. The fire whirl grew in intensity and speed and moves directly toward them, assistant of 1613 shouted "get in the trucks!" Crewmember of 1614 discarded the drip torch he was holding, taking refuge within E1613, alongside Captain, assistant, and crewmember of 1613. The ICT3 noted a time of 1322 and ran 30 feet to 1614 and took refuge in the cab.

The ICT3 then stepped out of the 1614 and, with Captain 1613, began extinguishing the residual fire around the ATV. It was noted that is the time is still 1322 and approximately 10 seconds had passed. Crews suppressed the fire that had crept around the water drop performed by T-716 south of the fence line. No property damage was noted with the exception of some 300 feet of burned hose. No injuries occurred.

A review of the events revealed the dust devil picked up fire, became a fire whirl, and traveled 200 yards to the vehicles in approximately 10 seconds.

Powell Dust Devil 1311 Hours as it picks up becoming a Fire Whirl 7/20/12 Josh Graham Photo 5

Powell Fire flame front created by fire whirl 7/20/12 Josh Graham Photo 7

Powell Fire Conclusion

At the end of the shift the ICT3 and newly arrived Safety Officer conducted an After Action Review (AAR) with all individuals involved in the fire whirl. Many of the lessons learned from this incident come directly from the participants and the AAR document they produced.

Throughout this incident, participants conducted themselves as a professional, aggressive, and competent Initial Attack force. They utilized the experience levels on hand to appropriately deal with a quickly emerging and potentially dangerous situation. Dust devils and fire whirls are naturally occurring and very unpredictable phenomenon in the fire environment. It is difficult, if not impossible to prescribe a course of action when dealing with either. The members of the two engines involved in the incident as well as the ICT3 and ICT3(t) displayed excellent judgment as their situational awareness (SA) developed throughout the fire. In the AAR, the participants were able to identify areas in which they performed well, and also turn a critical eye on their own actions to identify lessons that can be taught to the greater fire community.

- Many members mentioned the weather experienced on the fire was different than predicted and expected weather. They ensured that all resources were aware of this.
- There were many dust devils in the vicinity of the fire and within the burned area. As these dust devils developed throughout the day, the information was relayed to all firefighters that could be impacted by the dust devil.
- The dust devil that ultimately impacted the operation was initially sited by the ICT3(t) and relayed to the engines. This dust devil took several minutes to develop and was very large. As soon as the engine members were aware of its presence, they ceased firing operations until they could assess what impact the weather phenomenon would have on their operations. Before the dust devil approached the firing operation and became a fire whirl, the engine members immediately recognized its potential threat and retreated to the safety of their engines. The fire whirl crossed a 200 yard sage flat in approximately 10 seconds. Because of the good situational awareness the crew members maintained, they were able to remove themselves from harm's way in a short period of time.
- Throughout the day of July 20th, 2012, the IA resources on the Powell fire used good firefighting strategies and tactics to conduct safe initial attack. They chose the best and most appropriate spots to attack and contain the fire and utilized defensible spaces from which to deploy their engines.
- These crews had excellent inter and intra- crew communication and ensured that weather, strategies, tactics, and contingency plans were expressed and understood.

Lessons Learned

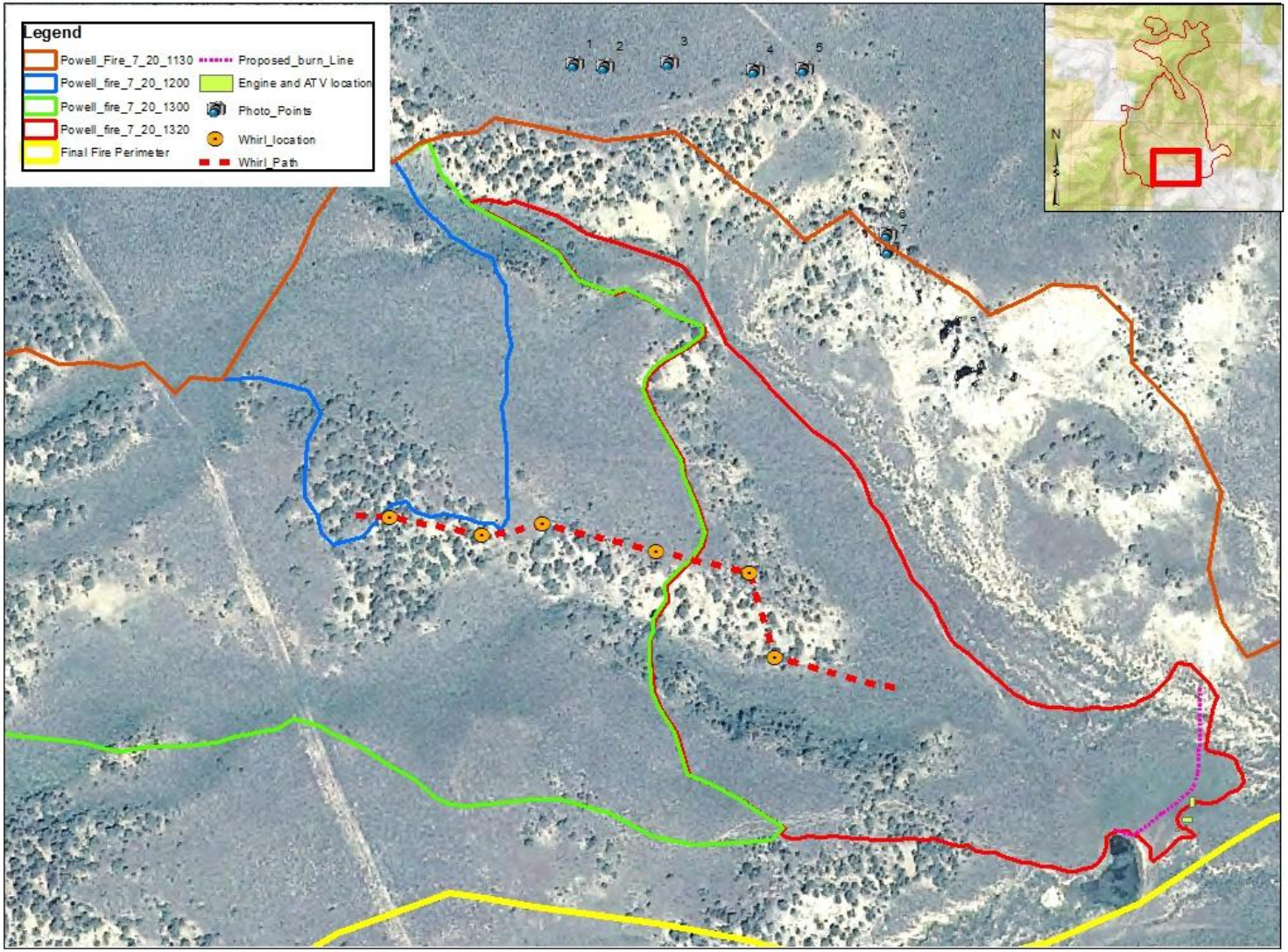
As stated earlier, many of the lessons learned from the Powell incident come directly from the AAR after the incident.

- When utilizing the term "safety zone", ensure that it can be employed as such by any resource including hand crews or civilians. The zone in which the engine crews took refuge was a good deployment site for any resource, but personnel without vehicles would not have been able to use it as a safety zone. The participants stated that if a hand crew wanted to utilize it as a safety zone, they would need to burn it out before it could be used for that purpose. Because the site had such sparse vegetation, the personnel were able to comfortably take refuge in their vehicle during the fire whirl and experienced no damage to personnel or equipment.
- Key in on weather conditions that are not predicted or expected. The winds that were experienced during the fire were not predicted or typical of the area. The crews did a good job of conveying that to all members throughout initial attack of the fire.
- Key in on multiple fire whirls or dust devils in the fire area as this is a good indicator of unstable air.

- Utilize past memories and experiences as predictors of potential outcomes. One crew member reminisced about a similar 2002 event.
- Recognize that in desert fuel types, decision time and space can be compressed. All resources involved in this incident were local and had several years of experience in this fuel type. They were able to maintain good situational awareness regarding weather, topography, and fuels and created a good outcome in a potentially dangerous situation. Out of area resources may not have experience dealing with light flashy fuels and may not be aware of the compressed time frames for decision making. Although it is always important for all firefighting resources to know and understand the Energy Release Component (ERC) and Burning Index (BI), it is critical that out of area resources understand the conditions they are working in and are aware of ERCs, BIs and any Fuels and Fire Behavior Advisories that may be different from their home unit.

Fire Progression, Dust Devil path, and Photo locations

Powell Fire 7/20/2012



Engine and ATV Locations

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