SCHULTZ FIRE

Safety Review

June 20th 2010 @ 1327 from Pittman Valley

FIRE SUMMARY

The Schultz Fire upon the Coconino National Forest, Southwestern Region was reported to Flagstaff Dispatch on June 20, 2010 at 11:08 by a private citizen. The fire was burning in fuel model 10, (timber with litter understory) at an elevation of 7,980'. The fire quickly escaped initial attack efforts transitioning to type 1 complexity. Several subdivisions within the Summit Fire District were threatened, which resulted in multiple evacuations. A Type 1 Southwest Incident Management Team (Hughes) was assigned and assumed command on June 21, 2010 at 06:00. Containment was achieved on June 30, 2010, and full control was achieved on July 13, 2010. The Schultz Fire consumed a total of 15,075 acres.

NARRITIVE

This narrative will focus upon the initial attack phase of the fire as the near miss which fuels the desire to document its occurrence was in the early phase of the fire.

On June 20, 2010, three individuals escape route was compromised without their knowledge. As the incident developed from single tree and group torching into a sustained crown run the individuals which were in three separate vehicles were forced to utilize their escape route. As they drove out the escape route they were forced to drive through active fire to reach a safe area. All three did escape to a safe area without any injury however some minor damage was done to vehicles due to heat.

While maintaining the anonymity of the three individuals is a part of this process it is important to share the following information concerning them as their experience levels are a significant portion of this report. They consisted of a district Engine Captain which was the initial attack Incident Commander, a senior officer within a Fire Department, and the district Division Chief. Each of these individuals was functioning well within their qualifications, and was each outfitted with all the proper PPE. Their experience levels is a factor since all were veteran fire fighters, which indicates that this type of dilemma can occur regardless of the experience levels of the fire fighters involved.

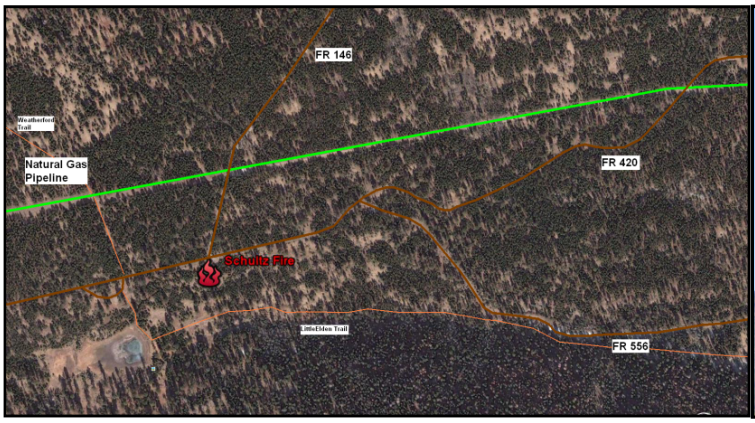
A review of the time lines shows that this fire developed rapidly, and the condensed time in which this event occurred played a key part in the issues discussed in this report. This time line is taken directly from the flash forms documented from The Flagstaff Dispatch Center.

- 11:08 fire reported by citizen to Flagstaff Dispatch
- 11:11-13, two engine crews and division chief dispatched to incident
- 11:30-31, engine crews, and division chief on scene, the IC reported the fire was a few acres, was spotting on both sides of Forest Road (FR) 420 and ordered additional resources including a heavy helicopter with a available dip site at Schultz Tank 300 yards west of fire. *(response time 19 minutes)*
- 11:41, division chief reports fire escaped initial attack, notify Summit Fire District of the high potential for evacuations. *(time on scene 11 minutes)*
- 11:45, initiate evacuations in Summit Fire District. *(time on scene 15 minutes)*
- 12:00, local F.D. officer enroute to meet with division chief at fire.
- 12:23, (approximate time) meeting of IC, F.D. officer, and division chief at FR 556, and FR 420 junction. *(time on scene 53 minutes)*
- 12:28, (approximate time) fire behavior forces the three individuals to make their escape. *(time on scene 58 minutes)*
- 12:35 all three individuals were in safe area, and continued suppression efforts. *(time on scene 65 minutes)*

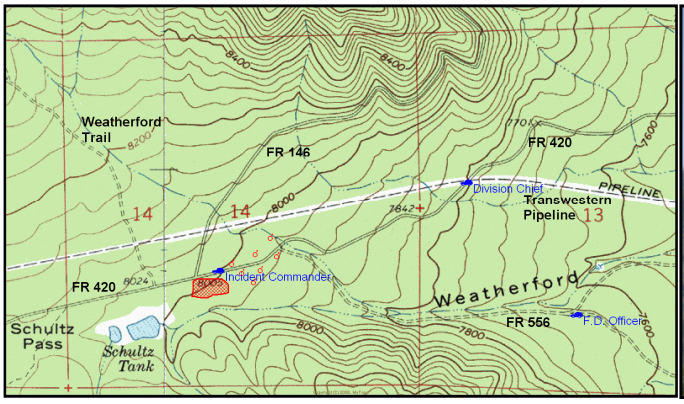
This timeline is displayed to emphasize the rapid development of the fire and the rapid changing of conditions which outpaced safety considerations that are paramount to engagement of any fire.

The fire continued to grow at a fast pace, and throughout the day consumed 9,180 acres. Spotting was documented at 1 ½ miles, and the actual rate of spread at the peak burning was 220 chains/hour (2 3/4 miles/hr.).

Another issue which impacted suppression efforts is that this fire occurred in a highly utilized recreation area. The heavy recreation use of the area was further compounded as it started on a weekend day, and father's day. The parking lot at the Schultz Tank Trailhead was full of vehicles, which were all empty as their occupants were hiking on many trails in the general area. With the rapidly growing fire and the unknown whereabouts of the occupants of the vehicles, location of the recreationist, as well as closure of the roads and trails into the area added to the complexity of the situation.



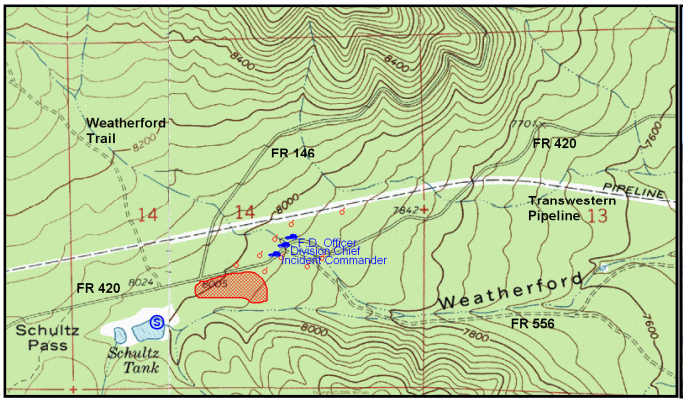
Upon arrival on the fire the Incident Commander ordered a heavy helicopter which was available locally. The fire at this time was 3-4 acres with individual tree torching, and quickly turning into group torching. Multiple spots were apparent and the decision was made to utilize the Type 1 helicopter to work the spots on the uphill side of FR 420 in attempts to keep the fire on the south and southeast sides of the FR 420. Utilization of Schultz Tank as a dip site made for very fast turnarounds. The engine crews were attempting to anchor the heel of the fire and work the south side of the fire along The Little Elden Trail in attempts to keep the fire from spreading onto Mt. Elden and the Dry Lake Hills area. An air attack platform was also ordered and over the fire.



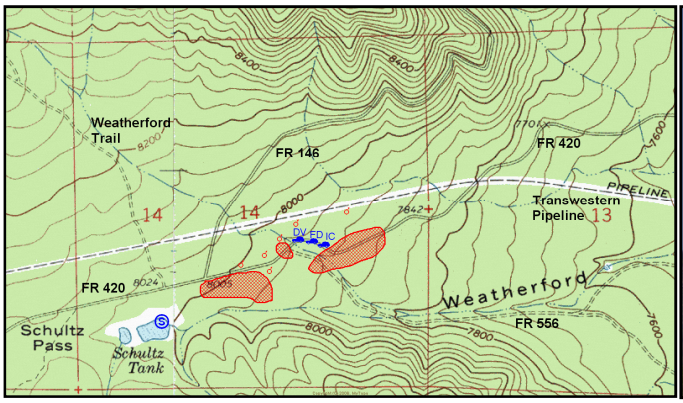
The intensity of the fire continued to build at a rapid rate, which indicated to the division chief that they were not going to contain the fire, and the warning of impending evacuations was made to Flagstaff

Zone Dispatch. This prompted the officer from the Fire Department to proceed to the fire and tie in with the IC and Division Chief to discuss the potential for evacuations, and a timeline to initiate those evacuations. The division chief headed north on FR 420 in attempts to get a better perspective of the fire, and see spotting distances as well as check FR 420 as a viable escape route. The Officer from the Fire Department radioed the division chief and they agreed to meet at the FR 556/420 road junction to make a plan. The division chief, Fire Department officer, and the incident commander met at approximately 12:23 to discuss trigger points needed for extended attack.

The junction of FR 420 and FR 556 was believed to be ahead of the fire and located at the farthest point of the spotting, it was felt that the road system was still a viable escape route. To get to the junction the IC had just driven FR 420 from Schultz Tank heading northeast, the Division Chief had just driven FR 420 from the east heading southwest, and the Fire Department vehicle had just came up FR 556 heading northwest. At the time they met all these routes had just been observed and while the fire was escallating they did not feel threatened or that their escape route was compromised.



Within 5 minutes of their arrival a spot fire 100 yards down FR 556 transitioned into the crown and started running across FR 556 headed to the northeast. The decision was made to head northeast on FR 420 to escape. Another group of trees started torching southwest of the FR 556/420 junction, which made heading northeast on FR420 the only escape route available. They headed northeast on FR 420 which was clear from fire and a viable escape route 5 minutes earlier, however at the time of escape it was being impacted by fire and forced all three vehicles to drive through active fire. Heavy smoke made visibility very poor and compounded escape efforts.



A Safenet ID#86VNB2SAFE was filed by the District Division Chief to document the event, on June 29, 2010. This Safenet was openly discussed at the Schultz Fire After Action Review. In subsequent conversations with The Coconino Forest Supervisor, and Southwestern Regional Fire Operations the three individuals agreed to prepare this document to discuss what they did right, what they did wrong with sincere hopes that situations such as this may be prevented on future incidents.

DISCUSSION

Public and firefighter safety are the primary objective on every fire. To aid each of us achieve that objective the wildland community has developed several rules and procedures. The Standard Fire Orders, Situations That Shout Watchout, and L.C.E.S. provide us with proven operating procedures that allow us to fight fire safely. Additionally, elements of fire behavior topography, fuels, and weather, provide in site that may assist others in making sound decisions on future fires. Each of these will be reviewed to not only determine any errors made, but to display how adherence to them can prevent future repetition of these situations, and hopefully prevent someone like you from preparing one of these reports.

LOOKOUTS, COMMUNICATIONS, ESCAPE ROUTES, AND SAFETY ZONES (L.C.E.S.)

LCES was clearly not in place when the need to escape presented itself. However, five minutes earlier as the division chief drove north on FR 420 LCES was in place. LCES was lost in this short time frame, which points out on fires that are changing and developing maintaining LCES becomes more complex and demands constant attention.

- *Lookouts;* There were no lookouts in place that could monitor the FR 420 escape route. A lookout in the proper location could have provided earlier warning and prevented the near miss. The density of the forest and topography did not allow a good lookout location. The movement of the fire also precluded a lookout in one location being able to see the entire fire. The distance that you could see due to the dense forest was not as far the spotting that was occurring.
- *Communications;* There were no communications issues that impacted the near miss. Communications were in place and functioning well.
- *Escape Routes;* The escape routes from the fire were the road system. An escape route is one of the key items that a lookout should monitor, and communicate if the escape route is compromised. As discussed earlier the escape route was compromised in a very short time span, but compromised it was.
- *Safety Zones;* While there were no Safety Zones designated this fire in a developmental stage the safety zone was just getting away from the fire on the road system. While the main group of firefighters did have a safety zone the three individuals were not with that group did not discuss a formal safety zone. Their safety zone was to drive away from the fire.

STANDARD FIREFIGHTING ORDERS

The standard firefighting orders are rules of engagement that are not to be violated. In review it was determined that some were.

- *#2. Know what your fire is doing at all times;* While all three individuals were aware of what the main fire was doing, spot fires were present that caused the flare up. Some of these spot fires were hidden from the fire personnel due to dense stands of timber, smoke, and the distance they developed from the main fire. This is one of the biggest factors in the near miss.

- *#5. Post lookouts when there is possible danger.* As stated earlier in this document, there were no lookouts posted for the three individual's location. Lookouts that were posted on the main fire could not see the location of the FR 420 FR 556 junction this allowed the rapid deterioration of the escape route with no warning. An Air Attack platform was over the fire; however the area of the road junction was obscured by smoke. Air Attack can definitely help but should never be relied upon as a lookout. In some situations multiple lookouts may be required to insure safety of all firefighters.

- *#10. Fight fire aggressively, having provided for safety first.* While the main group of firefighters remained safe and well within the fire orders, the near miss clearly was unsafe. Initial attack actions were aggressive; however the safety of the three was compromised.

One standard firefighting order which was followed preventing additional issues was:

- *#6. Be alert, keep calm. Think clearly. Act decisively;* As the situation developed and the escape was in progress the three did keep calm, and acted decisively which had they not followed this fire order the outcome could have been tragic. The level of experience contributed to the rapid withdrawal due to the ability to recognize that to remain for even the shortest period of time was untenable. Others with less experience may have hesitated and not been able to escape.

SITUATIONS THAT SHOUT WATCH OUT

Unlike the standard fire orders the situations that shout watch out are not to be followed absolutely; however they offer safety issues that should be reviewed and considered if violated to develop safe fire fighting objectives.

- *Attempting frontal assault on fire.* While this was not the objective of the main body of fire fighters, the near miss situation did happen at the front of the fire. Extreme caution needs to be used at or near the front of a fire, especially one that is developing. The initial attack forces did access the fire from the "front" of the fire this was done in attempts to stop the fire in the initial attack phase. To send initial attack forces around to the heel of the fire would have meant going completely through Flagstaff and response times would have been significantly longer. While the extended initial attack times would have prevented the near miss from happening, due to the increased response times the fire would have already grown beyond the area the near miss

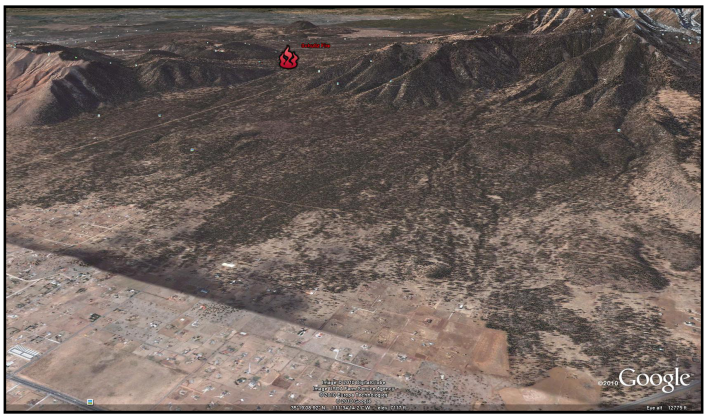
occurred. The thought and desire was to get on the fire quick and stop spread at an early phase of the fire.

- *Unburned fuel between you and the fire.* While there were multiple spot fires in the general area, unburned fuel between the individuals and the fire allowed the fire to gain a tremendous intensity negatively impacting escape routes.
- *Weather becoming hotter and drier.* The fire was reported at 11:08, and as happens most every day the weather would dry and get warmer throughout the day.
- *Getting frequent spot fires across the line.* This was occurring and probably the biggest indication that all this was going to happen. The distance that some of the spotting was occurring was not known, and it is felt that this was the major contributor to the near miss. As stated earlier in this report the type 1 helitanker was instructed to drop on spots and attempt to keep the fire on the downhill side of FR 420. Both the Incident Commander, and the Division Chief watched where the drops were being made, and both felt this was something they missed in determination of the spotting distance. As the first few drops were made they were at a distance further than any spots that were known by either the Incident Commander or the Division Chief. In retrospect this was one thing both thought should have been more of a warning.

LOCAL FACTORS

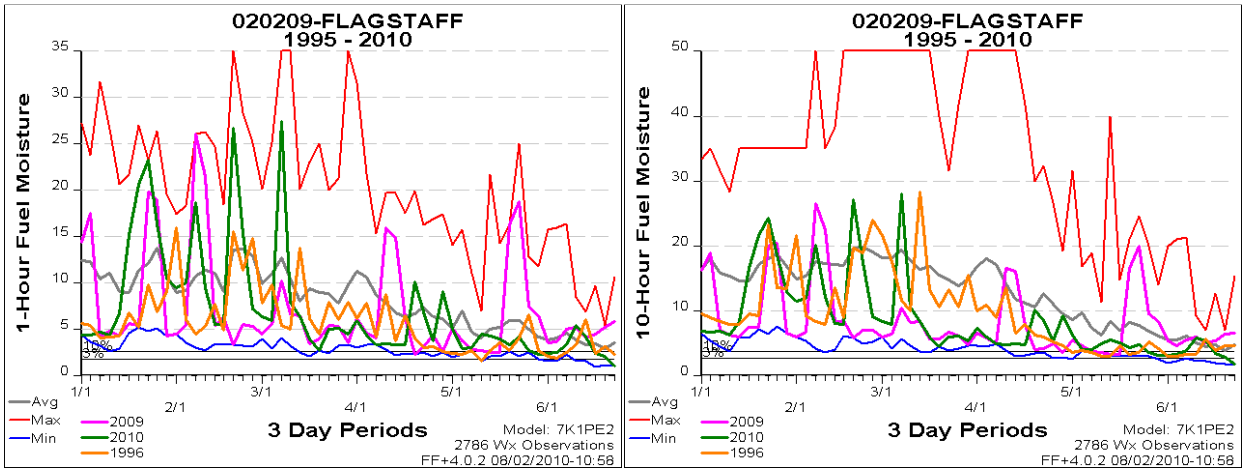
Most agencies have areas that are known to have an elevated risk of catastrophic fire. Everyone that has fought fire upon the Coconino National Forest knew that the Schultz Pass area presented the threat of a large fire.

Topographically Schultz Pass is a large saddle between Mt. Elden and The San Francisco Peaks, and is subject to the compression of air flow and the increase in wind velocity associated with this type land form. The Schultz Fire started in this saddle and quickly spotted on the base of a timbered slope. The point of origin of the fire was at an elevation of 7,980', at this latitude timberline is at 11,500', so the fire spotted at the base of a slope that provides excellent potential for growth.

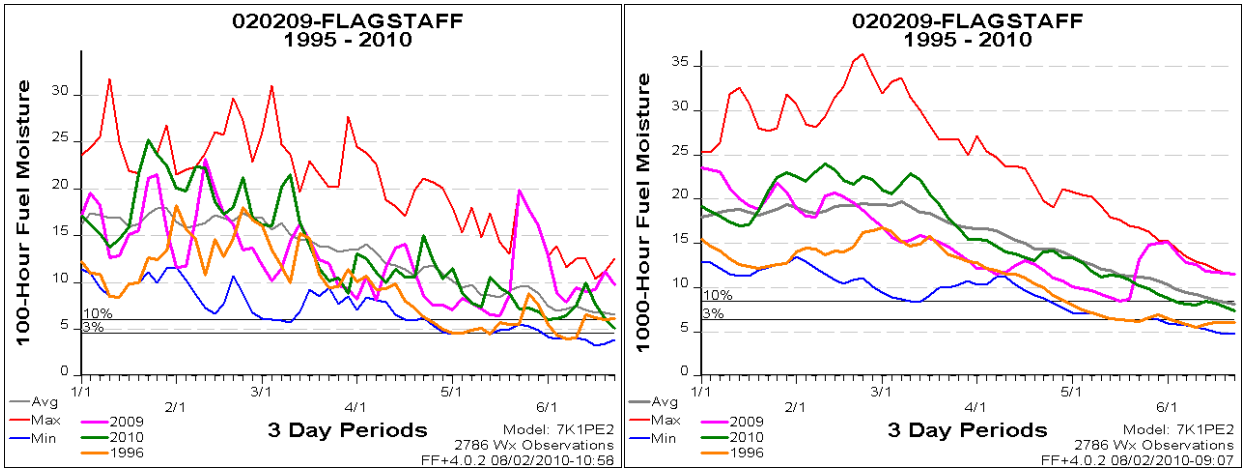


The fire burned in fuel model 10 (timber with a litter understory) and consisted of dense stands of ponderosa pine with a heavy dead and down component. Crown bulk densities are high and crown

heights are suitable for fire to transition readily into the crowns. There have been few fuel treatments in the area, and the fire return interval was decades. Areas with open stands have a heavy grass understory of Arizona fescue, and mountain muhley that itself has a high live to dead ratio due to lack of fire or grazing and are also very conducive to fire spread. On June 20 the one hour fuels were at 3, the ten hour fuels were at 3, the one hundred hour fuels were at 6, and the thousand hour fuels were 8.



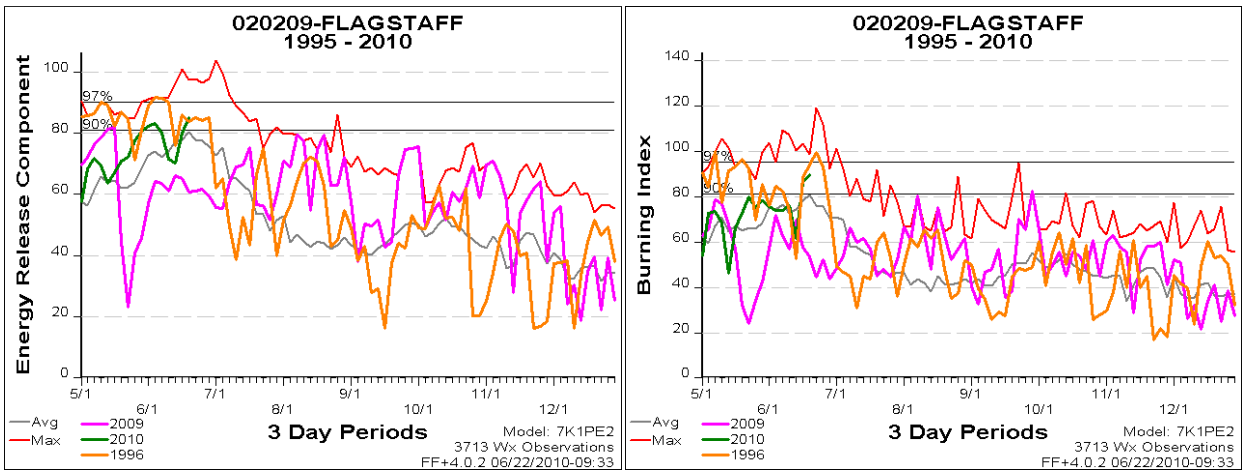
These graphs plot the 1 hour and 10 hour fuel moistures. They are added to this report to display indicators that were available which track the dryness of the fuels. Abundant winter snowpack (6'-8') at the point of origin made some believe the fire season would not develop. This graph displays that these fuels fell below the 1996 levels which are used as a benchmark upon this forest for fire activity and dryness.



These graphs plot the 100 hour and 1,000 hour fuel moistures. They display the 100 hour fuels also fall below the 1996 benchmark, while the 1,000 hour fuels did not.

The forecasted weather on June 20 called for maximum temperatures 73 – 86 degrees. Minimum humidity was forecast at 8% - 13%, with southwest winds 15 -20 M.P.H. and gusts to 30 m.p.h. There was 0 chance of precipitation, Lightning Activity Level (LAL) was 1 and low, the Haines Index was 4 and

low, the mixing height was 11,200', and the ventilation was excellent. The Energy Release Component (ERC) had just surpassed the 90th percentile the day before June 19, 2010.



These graphs display the Energy Release Component (ERC) and the Burning Index (BI). The ERC was equal to the 1996 benchmark, while the BI was below the 1996 benchmark and closer to average conditions.

On June 19, 2010 the Hardy Fire burned on Arizona State and private lands within the corporate boundary of Flagstaff, Arizona. The Hardy fire also burned in fuel model 10 (timber with litter understory) and started in an untreated stand of ponderosa pine. This fire was in the urban interface and resulted in multiple evacuations. The fire quickly escaped initial attack and also displayed rapid transition to crowns, prolific, and long range spotting. Fire behavior observed on the Hardy Fire was a strong indication that fuels had reached critical levels. The behavior of The Hardy Fire was a major factor in the Division Chief making the early determination that the Schultz Fire had escaped initial attack, and drove the evacuation request. The Hardy Fire burned into a fuel treatment project which reduced fire intensity and allowed suppression resources to conduct successful burnout operations stopping the fire at 282 acres.

CONCLUSION

The rational of this report is twofold, the first part is to report what happened, and the second and most important is to share the knowledge gained here to prevent future occurrences of similar events. This report was developed to provide a candid account of the events of June 20, 2010, and determine actions that can be utilized by firefighters on future incidents to provide for their safety. While fighting a fire of this scope a sense of urgency is understandable and expected, injury or loss of life are not.

If one factor was chosen to offer advice or guide future firefighters it would be to monitor spotting. Spotting is a key factor indicating that the fire may exceed your capabilities to suppress it. Long range spotting is the main cause of this near miss. Spotting occurred at a greater distance than could be seen.

Another key factor was the behavior of the spot fires that were observed. The spots quickly transitioned into the crowns, which in turn produced more spotting.

The rules we have for engagement work. They have been tried and tested for decades, additions have been made, such as L.C.E.S. that aid firefighters in making the safe and correct decisions. One key factor on this incident was how fast you can go from being in compliance with our rules of engagement to falling out of compliance. On fires that are developing closer attention needs to be given to safely accomplish objectives.

The main group of firefighters remained in compliance with our rules of engagement. As the IC, and Division Chief left that group they left the safety associated with the group. The old adage "there is safety in numbers" holds true on fires. In leaving the group they became responsible for insurance that the rules of engagement were followed individually. While getting away to plan future actions on fires is sometimes needed, extreme caution should be taken as resources are separated from the main body of firefighters. Compliance with the rules of engagement is more difficult to maintain individually.

It was asked if the evacuation notice took the Division Chief's attention from safety to the evacuation process. In the Flagstaff area a group exists called The Ponderosa Fire Advisory Council (PFAC). This group consists of all emergency responders in the Flagstaff area. PFAC has an operations Plan which is constantly updated addressing wildland fire issues. A large part of PFAC is preplanning for emergencies, and drills which are conducted annually. Due to the planning through this organization the evacuation process will occur independently, without impacting operations personnel. The Division Chief made the call to start the process, and then could immediately resume suppression operations. This is a very desirable situation to create if it is not already in place.

The area this fire occurred had both the topography, and fuel bed needed to cause a catastrophic fire. This being said weather was the only thing needed to make this fire behave the way it did. The Energy Release Component (ERC), and fuel moistures, indicates an upswing in fire behavior possibilities. The weather that day was the catalyst for the fire to exceed suppression efforts. Therefore paying close attention to weather forecast, and ERC charts, and all other fire indicators is very important. It is extremely important as the fire danger is escalating each year, and conditions are getting worse.

The Schultz Pass area is one that has been commonly accepted as having a very high risk of a large fire. It is very important to respect the areas on each of our units that have elevated risk of large fires. Close attention to weather and safety should be observed especially during the initial attack of fires in areas of high risk.

The safety issues associated with transitions have been discussed on many near miss and tragedy fires. The emphasis on initial attack events within this report are a result of the fire transitioning from initial attack to extended attack. This is plainly one of the most hazardous phases of a fire making maintenance of our rules of engagement a fast changing, but even more important challenge. Inability to maintain the fire orders or L.C.E.S. is strong indication that a fire is transitioning out of initial attack and into extended attack.

The individuals involved in the near miss had several years experience. It needs to be pointed out that everyone regardless of qualifications or tenure must comply with the rules of engagement. All three were aware of the potential this fire had due to its location, and conditions, yet were still surprised by the intensity and fast development of the fire.

One key factor has yet to be discussed, and that is withdrawal from the fire. We are all taught if our rules of engagement are compromised then we need to withdraw, reboot, and resume suppression efforts once we are back in compliance. Withdrawal is always an option. Not being able to truthfully say that you are in compliance with the rules of engagement is a strong indication that withdrawl is in order. There are some days you can catch a fire, and there are days when you can't. Making the distinction is where the rub lies. To error on the side of safety is always the correct option.